HORTICULTURAL ABSTRACTS

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Initialled abstracts and reviews not by Bureau staff are by A. M. Massee, H. B. S. Montgomery, A. F. Posnette and H. C. Ruck of the East Malling Research Station, W. B. Turrill and V. S. Summerhayes of the Royal Botanic Gardens, Kew, and J. Schofield.

INDEX OF CONTENTS.

			Nos.
MISCELLANEOUS	Abstr. 83.	Noted 23	1062-1145w
General			1062-1080
Climatic factors			1081-1086
Biochemistry			1087-1089
Physiology			1090-1103
Growth substances			1104-1114
Nutrition and manuring			1115-1123
Soil problems			1124-1127
Irrigation			1128-1131
Glasshouses and air-conditioned structures			1132-1138
Machinery and apparatus			1139-1144
Noted			1145a-1145w
TREE FRUITS, DECIDUOUS	Abstr. 90.	Noted 18	1146-1236r
General			1146-1152
Breeding and varieties			1153-1166
Propagation and rootstocks			1167-1183
Winter hardiness			1184-1189
Growth phenomena			1190-1191
Pollination			1192-1197
Spraying for cultural purposes			1198-1201
Soil management			1202-1206
Nutrition			1207-1210
Composition of plants and fruit			1211-1216
Storage			1217-1230
Packing, marketing and processing			1231-1235
Noted			1236a-1236r
SMALL FRUITS, VINES AND NUTS	Abstr. 58.	Noted 11	1237-1295k
Small fruits			1237-1254
Vines			1255-1286
Nuts			1287-1294
Noted			1295a-1295k
PLANT PROTECTION OF DECIDUOUS FRUITS	Abstr. 139.	Noted 19	1296-1435s
General			1296-1300
Disturbances of nutrition or of unknown origin			1301-1311
Climatic factors			1312-1325
Viruses			1326-1332
Bacteria			1333-1335
Fungi			1336-1367
Nematodes			1368-1370
Mites			1371-1374
Insects			1375-1399
Other pests			1400-1411
Antibiotics			1412-1413
Fungicides and insecticides			1414-1434
Noted			1435a-1435s
WEEDS AND WEED CONTROL	Abstr. 49.	Noted 11	1436-1485k
General			1436-1438
Herbicides			1439-1454
Particular weeds			1455-1465
Control of woody plants			1466-1468
Weed control in ornamentals and turf			1469-1472
Weed control in sugar cane and other tropical crops			1473-1478
Weed control in vegetables, fruit and tobacco			1479-1484
Noted			1485a-1485k
VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE	Abstr. 161.	Noted 35	1486-1648i
General			1486-1523
Asparagus			1524-1525
Brassicas			1526-1545
Celery			1546-1549
Cucurbits			1550-1558
Legumes			1559-1587
Mushrooms			1588-1591
Okra			1592
Onions and related crops			1593-1601
Rhubarb			1602
Root crops			1603-1611
Salad crops			1612-1615
Spinach			1616
Tomatoes and capsicums			1617-1646
Noted			1647a-1648i
TOBACCO	Abstr. 48.	Noted 15	1649-1697o
General			1649-1653
Breeding and varieties			1654-1657
Seeds and seed beds			1658-1660
Rotations and cultivation			1661-1665
Nutrition and irrigation			1666-1669
Flowering, topping and desuckering			1670-1675
Hail damage			1676
Diseases and pests			1677-1689
Composition			1690-1692
Harvesting, curing and by-products			1693-1696
Noted			1697a-1697o
MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS	Abstr. 44.	Noted 19	1698-1742s
Culinary and spice plants			1698-1705
Drug plants			1706-1717
Essential oils			1718-1719
Fibres			1720-1726
Hops			1727-1732
Rubber plants			1733
Seed oils			1734-1738
Tannins			1739-1740
Sundry plants			1741
Noted			1742a-1742s

	Nos.
FLORICULTURE Abstr. 70. Noted 23	1743-1813w
General	1743-1751
Annual and herbaceous plants	1752-1766
Bulbs, tubers, etc.	1767-1778
Lawns	1779-1785
Roses	1786-1790
Other trees and shrubs	1791-1812
Noted	1813a-1813w
SUB-TROPICAL FRUIT AND PLANTATION CROPS Abstr. 98. Noted 16	1814-1912p
General	1814-1815
Avocadoes	1816-1819
Citrus—varieties, rootstocks and propagation	1820-1831
Citrus—cultivation and irrigation	1832-1835
Citrus—tree composition and nutrition	1836-1840
Citrus—growth phenomena	1841-1845
Citrus—fruit composition	1846-1847
Citrus—frost and wind protection	1848-1853
Citrus—diseases and pests	1854-1882
Citrus—harvesting, packing, storage and products	1883-1890
Macadamias	1891
Olives	1892-1906
Passion fruit	1907
Tung	1908-1911
Noted	1912a-1912p

	Nos.
TROPICAL FRUIT AND PLANTATION CROPS Abstr. 165. Noted 39	1913-2079m
General	1913-1919
Bananas	1920-1931
Cacao	1932-1969
Cloves	1970
Coconuts	1971-1977
Coffee	1978-2000
Mangoes	2001-2003
Oil palms	2004-2006
Papaws	2007-2011
Pineapples	2012-2020
Rubber trees	2021-2034
Sugar cane	2035-2065
Tea	2066-2073
Sundry crops	2074-2076
Cover crops	2077
Noted	2078a-2079m
NOTES ON BOOKS AND REPORTS Abstr. 39. Noted 13	2080-2119m
Books	2080-2095
Annuals and reports	2096-2113
New or revived periodicals	2114-2118
Noted	2119a-2119m

Total abstracts 1,044. Noted 242.

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

SALIENT ITEMS Vol. 24. No. 2

"Salient Items" made its debut in Number 1 of this volume. Comments on it and on other features of *Horticultural Abstracts* were invited and we are very grateful to those few who have already responded.

On others, who have so far kept silent, may we venture to urge the point that, since they pay the piper, they should also call the tune. Here is an opportunity to tell us not only where "we get off" but also how we can improve the usefulness of the journal.

In our autumn number we hope to discuss your ideas and consider how and to what extent they can be implemented.

ANTIBIOTICS

In plants:—Many Argentinian plants have been tested for anti-bacterial constituents (1413).

Effects on plants:—Studies on cucumber seedlings show that some, but not all, antibiotics are absorbed by the roots and translocated to the leaves (1555). In a series of tests on beans in Jamaica some antibiotics proved phytotoxic while others stimulated growth (1412); in the same series of tests certain substances affected, but did not fully control, a virus disease in a weed.

As bactericides:—In Missouri streptomycin and terramycin have shown great promise when applied as sprays to control fireblight of apples (1333). In Australia the same compounds and aureomycin have proved effective in *in vitro* tests against bacterial pathogens of several vegetables.

CONTROL OF ENVIRONMENT IN BUILDINGS, ETC.

Dutch papers deal with the construction, heating, humidification, ventilation and uses of air-conditioned sheds (1135, 1136 and 1778). Another Dutch paper compares four methods of heating glasshouses (1133), while two British papers discuss respectively the panel method of insulation to reduce heat losses at night (1134) and methods of providing supplementary light (1138). From New Zealand comes a description of a humidity-control system for air-conditioned cabinets (1137).

GROWTH SUBSTANCES

Natural:—From England comes a claim (1108) to have made the first isolation of a growth hormone from the leaves and stems of an actively growing higher plant; the substance 3-indolylacetonitrile proved appreciably more active than the corresponding acid.

Not so natural:—In the United States a compound, α-methoxyphenylacetic acid (1109, 1110), has shown curious peripatetic tendencies. This substance, called MOPA for short, is not only capable of

forming secondary as well as primary galls in treated plants but is able to pass, apparently unchanged, from the roots of one plant to another *via* soil or a nutrient solution.

General:—Many other papers describe investigations involving the use of growth substances. Some are mentioned below in the notes on vegetative propagation.

MACHINERY AND EQUIPMENT

Machines:—The market gardener is well served by descriptions of three machines, one British (1139) and two Russian (1141), for making soil blocks, a portable British pot cleaning machine (1142), a portable American unit for steam sterilizing soil (1517), and the development in Switzerland of a conveyer belt system to hasten the pricking out of seedlings (1499). Weightier material is represented by American machines for cutting up prunings (1283), a review of sugar cane harvesters (2061), and a new Australian cane sett cutting machine (2047). Also from Australia comes a new anti-frost wind machine (1848).

Sprayers and dusters:—The Americans describe a small sprayer, that can be built in a farm shop, for applying herbicides (1438) and a new orchard duster that is said to be both efficient and economical (1880).

Tools and apparatus:—A tool for making whip-and-tongue grafts mechanically has been tested on coffee and tung in Madagascar (1982). From England a description is given of an inexpensive integrating recorder for measuring daylight (1144), and from America of apparatus used to remove aseptic cylinders from carrot roots (1143).

NUTRITION

Diagnosis of mineral deficiencies:—Studies on the use of foliar diagnosis for oil palms in Dahomey (2005) have not only confirmed the fact that variations in nutrient status occur at different seasons of the year and between leaves of different ages, but have revealed that there are significant differences in the leaf contents of the major elements in the morning and evening of each day. The effect of the presence of fruit and of other factors on the mineral composition of leaves is indicated by detailed studies in Japan (1208). Further evidence is adduced from Trinidad on the value and application of rapid chemical tissue tests to determine mineral levels in cacao (1951), and a method is described from New Zealand for extracting tracheal sap from the shoots of apple trees in quantities sufficient for analysis (1207).

Adsorption and absorption of nutrients:—American work (1838) suggests that the accumulation in roots of several heavy metals from mildly acidic solutions occurs as a non-vital process; for example, citrus roots killed in boiling water accumulated essentially the same amounts of these elements as did living roots. Other American studies throw fresh light on the effects of phosphorus on the adsorption and absorption of iron (1117) and on the absorption and translocation of radioactive manganese (1118). The results are reported from Australia (1115) of a study on the relations between salt uptake and external concentration and from Germany (1501) of complex investigations on the interrelationships between chloride and sulphate ions on the one hand and such factors as soil moisture, light, potassium and nitrogen source on the other.

Deficiency disorders:—In Florida sprinkling the crowns of celery plants suffering from black-heart with calcium salts produced a temporary recovery (1546). Other Florida work on the control of yellow spot of citrus with molybdenum sprays suggests that this element is not very mobile within the tree (1840). Activity continues in the experimental use of chelated iron compounds to correct iron deficiency chlorosis in various plants (1502, 1802, 1952).

New essential (?) elements:—"Vanadium an essential nutrient?" is the title of a review article (1145 l); Californian work (1120) indicates that it is, at least so far as algae are concerned. Both strontium (1119) and rhenium (1507) salts are absorbed and translocated by plants; their functions, if any, remain obscure.

POLLINATION

Russian work:—The Russian passion for pollination shows no signs of abating; all six papers mentioned below emanate from them. Studies on deciduous fruits (1192, 1193, 1195), citrus (1843) and small fruits (1238) show that in most, but not all, cases improved fruit setting resulted from the use of mixtures of pollen either of the same variety from different sources or of different varieties or species. Pollen source alone also exerted an influence on set (1193) and even on the development of seedlings (1195). The pollen parent used was found to affect the rate of germination of apple seeds (1194) and the quantity of pollen used the vigour of currant and gooseberry seedlings (1238).

ROOTSTOCKS AND SCIONS

Identifying rootstocks:—Paper chromatography has been used in America to distinguish sour orange from other citrus rootstocks (1826). Colorimetric methods have been investigated in Israel (1825).

Incompatibility:—Histological studies of incompatible plum combinations are reported from Britain (1177).

Rootstock effects on scions:—The extent to which rootstocks may alter the characteristics of scion varieties is exemplified in a description from Russia of the behaviour of pear varieties top-worked on to

relatively old trees of different genera (1176). Difficulties that sometimes exist in determining rootstock effect are indicated indirectly from trials in Finland (1170); apple varieties cropped much more uniformly on seedling stocks than on clonal Malling stocks owing, it is thought, to the greater winter hardiness of the former. In intergeneric grafts of medicinal plants in Russia the rootstocks affected the morphology and the alkaloid content, not only of the scions, but also of their F_1 seedlings (1708).

Scion effects on rootstocks:—In Russia apple trees raised from root cuttings taken from stocks worked with different scion varieties showed strong mentor effects (1175).

SMOG

Five more papers have come to light on the injuries caused to plants by olefinic peroxides (1082, 1083, 1085) and by sulphur dioxide (1084) and on the effects of atmospheric fluorides on the fluoride contents of the leaves of fruit trees growing at various distances from the source of the pollution (1325). Fortunately work on the olefinic peroxides already suggests that measures may be found to protect plants against these petroleum derivatives, but just what happens in areas where all three pollutants are active remains shrouded in ——.

VEGETATIVE PROPAGATION

Regeneration:—Studies in Britain on seasonal variations in the power of root cuttings to regenerate are being extended (1091, 1240, 1241). Differences found in Russia in the behaviour of roses raised from root cuttings and stem cuttings suggest that the former are physiologically younger (1787). Somewhat similar differences were found between vine plants raised from cuttings taken from seedlings and plants raised from cuttings taken from the parents of those seedlings (1263).

Cuttings:—Outstandingly successful results are reported from the United States in rooting leafy cuttings of mahaleb cherries following immersion in a combined anti-transpirant-nutrient solution, soaking the bases in adenine and finally dipping in indolebutyric acid in talc (1172). Growth substance responses are also reported in two papers from Poland, the first of which is directly concerned with the responses of ornamental soft wood cuttings (1799), while the second may be of indirect interest in that it shows that growth substances can promote branching in the root systems of seedlings (1169). A possible pointer to a new technique in striking cuttings is the discovery in the United States that localized X-ray treatment of stems may induce adventitious root development (1094). Further information is provided in several papers on the so-called constant mist method of propagation (1795, 1796, 1800).

Marcots:—The concentration of indolylbutyric acid applied to marcots enclosed in polyethylene film had a marked effect on root production by various ornamentals in Britain (1794). This suggests that an American plastic film treated with plant nutrients, hormones, insecticides and fungicides (1174) may not be universally successful. In trials with polyethylene film in India this material did not prove sufficiently durable (1798).

Grafting:—Two new methods of grafting are described from Russia. The first is a double graft resulting in two parallel sections of stem, one stock and the other scion, which, used on tomatoes, is said to improve compatibility and intensify rootstock influence (1622). The second is a technique for grafting a plumule onto a small seedling (1809). A modified chip budding technique has given promising results with walnuts in Czechoslovakia (1293). In America ornamentals hitherto grafted in the greenhouse can now be grafted in nursery beds with the aid of plastic "wigwams" (1797).

WEED CONTROL

Herbicides:—This number of *H.A.* is perhaps notable for the indication that 2,4-D may be losing its pre-eminent position as the most popular of the herbicides now being scattered so liberally on the face of the innocent earth; CMU is mentioned specifically an equal number of times, and several other compounds are receiving proportionately more attention than hitherto. Damage to neighbouring crops by herbicides drifting may be reduced by producing these materials in pelleted form (1473).

Weeds:—As an aid to identifying weeds a new book (2089) describing the characteristics of seedlings of North American weeds should be useful at least in that continent. Studies on the interactions of crop-weed associations remain rare, but mention may be made of an observation in Florida that newly planted tung trees produce many fewer feeder roots under weeds than under clean cultivation (1908).

WINTER HARDINESS

Basic factors:—In Russia apple trees raised on seedling stocks from buds taken from the middles of scion shoots were hardier than trees raised from buds taken from the lower or upper parts of the same shoots (1185). Again in Russia roses raised from root cuttings were hardier than the same species raised from stem cuttings (1787). In Poland apple trees grown as standards were more susceptible to injury than half-standards or bush trees grown in the same orchard (1188). Various other papers touch on the question of varieties, rootstocks or intermediates (1156, 1170, 1179, 1180, 1185, 1189, 2102).

Seasonal factors:—In Canada it has been shown that susceptibility to winter injury is enhanced by incomplete wood maturity as measured by a relatively high water content of shoots (1184). Both Canadian and Polish studies suggest that the rate of transpiration of water from shoots may also be a guide to

frost susceptibility, the more susceptible varieties losing more water than resistant varieties under some conditions (1187, 1320). In Germany a relationship was found between the frost resistance of chrysanthemum flowers and osmotic values (1757). In Russia early summer drought resulted in incomplete wood maturity and severe winter injury to apples (1185), while with stone fruits climatic conditions which resulted in the early completion of fruit bud development accentuated frost susceptibility (1186). Also from Russia come papers on winter hardiness and frost protection in vines (1316, 1318, 1319) and in hazel nuts (1289).

Super-cooling and freezing:—Investigations in California on super-cooling (cooling below freezing point without ice formation) and subsequent freezing in lemon fruits, though not concerned directly with winter injury to trees, may throw some light on the stages leading to the injury of plant tissues (1852).

MISCELLANEOUS

Among points which might be missed are:

Phytophthora cactorum:—This soil-inhabiting organism, which has been known for many years to cause a stem rot of apples and other tree fruits in North America (1345), is now creating something of a stir in Europe not only on apples (1343, 1344) but also on strawberries (1354).

Soil sickness:—A method of growing seedlings in undisturbed soil profiles for diagnostic purposes is described from Germany (1307). Other papers review the subject (1306), describe the behaviour of apple seedlings planted in two successive years on the same land (1308) and blame nematodes for difficulties encountered in replanting apple orchards in parts of Australia (1368).

Soil fumigation:—Increasing work is being done on soil fumigants to control pathogens (1547, 1580, 1758, 1769), nematodes (1368, 1519, 1689, 1759) and weeds (1445, 1456, 1457). Some plants, e.g. carnations, may, however, be injured when planted in fumigated soil (1755).

Sawdust:—In Canada four different forms of conifer sawdust, used alone or mixed with soil, had markedly different effects on the germination of vegetable seeds and subsequent growth of seedlings (1569).

Fruit ripening:—At least with oranges and pineapples different parts of the same fruit may show different maturity indexes at the same time (2014).

Seed germination:—A popular description is given of a technique by which a combination of saturated air and a fungicide have been successfully used to germinate delicate or expensive seeds of ornamentals (1748).

Turf stabilization:—A method is described of restoring worn patches of turf with the aid of sand and bitumen (1782).

Field experimentation:—Horticulturally speaking the statisticians appear to have been hibernating. Only one paper, on the minimum plot size for vegetable field trials, is recorded (1487).

MISCELLANEOUS.

General.

(*See also* 2093, 2094.)

1062. Bryn Adda (N.A.A.S.).
Station Guide Bryn Adda Horticulture Demonstration Station, 1953, Bangor, N. Wales, pp. 7.

The aim of this station of 26 acres is to demonstrate the cultivation and performance of certain crops potentially useful to N. Wales, mainly small fruits and vegetables.

1063. Cleppa Park (N.A.A.S.).
Station Guide Cleppa Park Horticulture Demonstration Station, 1953, Newport, Mon., pp. 11.

The aim of this 68-acre station is to demonstrate the cultivation and performance of certain crops potentially useful to S. Wales, mainly small fruits, vegetables including salad crops under Dutch lights, and some apples, pears and plums.

1064. Luddington (N.A.A.S.).
Station Guide Luddington Experimental Horticulture Station, 1953, Stratford-on-Avon, pp. 15.

Notes on trials of top and soft fruits, vegetables, flowers and shelter screens.

1065. Rosewarne (N.A.A.S.).
Station Guide Rosewarne Experimental Horticulture Station, 1953, Camborne, Cornwall, pp. 23.

Trials at this station in the far south-west of England are noted as being in progress on red currant varieties, tulip fire, anemone problems, narcissus fly, bulb fertilizers, and bulb cultivation problems in general, shelter screens, broccoli, cauliflower and early potatoes.

1066. U.S. Department of Agriculture.
The Agricultural Research Center of the United States Department of Agriculture.
Agric. Handbook U.S. Dep. Agric. agric. Res. Administ. **43,** 1952, pp. 48, illus., 20 c.

The research institutes within the Agricultural Research Center at Beltsville, Md, include the Bureau of Agricultural and Industrial Chemistry, the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry, Soils, and Agricultural Engineering. Their work is briefly discussed.

1067. Wageningen, Instituut voor Tuinbouwtechniek.
Tuinbouwtechniek. **(Horticultural engineering.)**
[*Publ.*] *Inst. Tuinbouwtech. Wageningen,* [1954], pp. 112, illus.

In this publication, celebrating the tenth anniversary of the Institute of Horticultural Engineering, Wageningen, accounts are given by various members of the staff of the development of the Institute, of various aspects of its work and of some new horticultural techniques.

1068. ANON.
Aspects de la recherche agronomique en 1952. (Notes on agronomic research in 1952.)
Rev. Agric. Brux., 1953, **6**: 1699-1817.

Notes are given on research carried out at Belgian Government agricultural research stations in 1952. *Field crops*. Broad bean: spacing trial. Tobacco: new hybrid trials; trial of introduced varieties; *Nicotiana rustica* variety trials for nicotine production. *Fruit and market garden crops*. Apple: manuring, rate and method of application, diffusion in the soil. Pea: new hybrids. Tomato: outdoor cultural trials. Onion: new varieties; trials on bulb size for seed production. Lettuce: performance of spring, summer and winter lettuces in relation to sowing date; type of pot trials. *Phytopathology*. Vine leaf reddening: magnesium and Apple and pear scab: DNOC autumn spray to prevent perithecia formation. *Entomology*. Cherry fruit fly. Strawberry mite. San José scale. *Phytopharmacy*. Trial of insecticides prepared from different species of *Tephrosia*. Trials with the new synthetic organic insecticide, malathon. Herbicide trials in asparagus.

1069. BRITISH COUNCIL.
An illustrated review of the agriculture of the Commonwealth.
Brit. agric. Bull., 1954, **6**: 275-346.

Nothing specifically on horticulture, but authoritative articles on problems of agriculture in Canada, Ceylon, India, New Zealand, Pakistan, S. Africa, the Colonies, and the U.K.

1070. MCKIBBIN, R. R., AND OTHERS.
The changing pattern of agronomy and horticulture in Canada.
Advances Agron., 1953, **5**: 320-81, bibl. 6, illus.

V. *Horticulture* by M. B. Davis, pp. 366-75. The author gives a vivid survey of the trends and changing methods in Canadian horticulture since 1918. Forecasts of new developments include an expansion of horticultural crops to new regions with improved, more adaptable varieties, a possible decline in the area under tender fruits, such as peach, cherry and vine, in eastern Canada, and further progress in the mechanization of pruning and harvesting fruit.
VI. *Tobacco* by N. A. Macrae, pp. 375-80. The paper deals with statistics, breeding and fertilizers and soil amendments. An expansion of the industry in the immediate future is anticipated only for flue-cured tobacco.

1071. GAUTHIER, A.
L'horticulture dans l'est du Québec. **(Horticulture in eastern Quebec.)**
Agriculture, Quebec, 1953, **10** (1): 41-7.

Notes are given on kitchen- and market-gardening for local markets (greatest acreages carrot, sweet corn and cabbage), truck gardening for distant markets, notably Montreal (specialized crops of Siam cabbage and peas), production for processing (2 canneries), vegetable seed production, hot-house crops (chiefly lettuce), apples in private and commercial orchards, plums, cherries, strawberries and raspberries.

1072. STRICKLAND, A. G.
Horticultural development in S[outh] A[ustralia].
J. Dep. Agric. S. Aust., 1953, **57**: 119-22, 127.

Since the author reviewed horticultural development in 1944 [see *H.A.*, 15: 434] total orchard area has increased by 16%, and orange, peach and apricot plantings have gone up by 60, 50, and 20% respectively, while the apple area has gone down 10%, and the vineyard area has remained more or less stationary. The present position regarding research facilities, spraying, harvesting, and packing is discussed.

1073. FAO.
Prospects for agricultural development in Latin America.
[*Publ.*] *FAO Rome*, 1953, pp. 146, 5s.

A rapid expansion of agriculture is of particular importance to Latin America, partly because of the rapid increase in population and partly because industrialization and gradually improving living standards are leading to an increase in the individual demand for food and agricultural raw materials. If the important agricultural development already planned is achieved there should be a substantial improvement over the present situation by 1956/57, the post-war fall in exports should be sharply reversed and the rise in imports arrested. The plans for increased production, expansion of cultivated area, crop improvement, farm mechanization and economic measures are discussed.

1074. FAO.
Agriculture in the Near East. Development and outlook.
[*Publ.*] *FAO Rome*, 1953, pp. 33+78 [parts 1 and 2], 5s.

There have been important developments in the agricultural position of the Near East since the Second Near East Regional Meeting on Food and Agricultural Programs and Outlook in September 1951. Production reached record levels and on a per caput basis exceeded the pre-war average by an appreciable margin for the first time since the end of the war. Food supplies improved in many countries and the volume of exports increased, in particular for grain. Plans for future progress suggest a further impressive improvement by 1956. But many problems exist. Expansion of production has so far been concentrated in the food-surplus rather than the deficit countries and, as development intensifies, disparities in investment resources, notably between the oil-producing and some other countries, are becoming more marked and the absence of adequate funds in the latter may appreciably retard economic growth.

1075. FAO.
Agriculture in Asia and the Far East.
[*Publ.*] *FAO Rome*, 1953, pp. 58+163 [parts 1 and 2, price not stated].

The hard core of the world's food problem lies in this region. Even before the war millions lived in the borderland between malnutrition and semi-starvation.

The conditions of the war and the immediate post-war years led to a deterioration in agricultural production in the area and all efforts since have sufficed only to keep pace with population increase. Food production per head in 1952/53 is estimated at 83% of the pre-war level. From being a net exporter the region has become a substantial importer, but even so food supplies per head remain 10% lower than before the war. If all the present production targets and estimates are realized, which is by no means certain, the general level of agricultural production in 1956/57 will be about 15% higher than in 1952/53.

1076. METCALF, J. E.
The agricultural economy of Indonesia.
Agric. Monogr. U.S. Dep. Agric. Bur. agric. Econ. **15,** 1952, pp. 100, bibl. 26.

There is a chapter on commercial crops. These are rubber, tobacco, sugar cane, copra, palm oil, coffee, tea, cacao, hard fibres (chiefly sisal but also *Agave cantala* and Manila hemp), kapok, cinchona, and spices (pepper, cinnamon, mace and nutmeg).

1077. ROSSIN, M.
La Nouvelle-Calédonie. Ses possibilités agricoles. **(New Caledonia. Its agricultural possibilities.)**
Agron. trop., 1953, **8**: 456-65, illus.

Notes are given on climate, soils, population and present agricultural production including coffee, copra and vegetables. The chief obstacle to agricultural development is the smallness of the rural population. Given a sufficient rural population and a satisfactory market, development would be possible in coffee production, vegetable canning and fruit juice manufacture, tobacco, tung, perfume and drug plants.

1078. MINISTRY OF AGRICULTURE, LONDON, DEPARTMENT OF AGRICULTURE FOR SCOTLAND, MINISTRY OF AGRICULTURE, NORTHERN IRELAND.
Agricultural Statistics 1950-1. United Kingdom—Part I.
[*Publ.*] *H.M.S.O. Lond.*, 1953, pp. 41, 2s. 6d.

The Horticultural Section, pp. 29-41, contains statistical information on the following items: (1) Acreage of fruit; (*a*) land returned as used for fruitgrowing 1942-51, (*b*) area under small fruit 1949-51. (2) Production of fruit 1941-51: (*a*) orchard fruit, (*b*) small fruit and total fruit. (3) Acreage of vegetables (excluding potatoes), crops under glass, and flowers 1948-51. (4) Production of vegetables (excluding potatoes) 1941-51: (*a*) principal crops, (*b*) total of all kinds. The figures are tabulated separately for England and Wales, Scotland, Great Britain and Northern Ireland.

1079. PAREDES, A.
Especies ecuatorianas de importancia industrial ordenadas segun el sistema de Wettstein. **(Some economic plants of Ecuador arranged according to Wettstein's system.)**
Bol. Inst. Cien. nat., 1952, **1**: 80-99.

The Coniferae; the following orders of the Angiospermae—Fagales, Myricales, Juglandales, Salicales, Urticales, Piperales, Polygonales, and several Euphorbiaceae.

1080. EUROPEAN PLANT PROTECTION ORGANIZATION.
The protection of foodstuffs in store. Report of the stored products working party (Brussels, June 30-July 3, 1953).
[*Publ.*] *Eur. Plant Prot. Org.* [*E.P.P.O.*], 1953, pp. 42.

The Working Party was concerned only with insects and mites. It is in favour of uniform legislation in all European countries for the control of stored food infestation. It makes recommendations regarding measures of hygiene and appropriate chemical treatments for stored products. One of the infestation problems discussed was the use of high-frequency electric currents for weevil destruction. The method is being tested at Gembloux and, while too expensive for general use, may be of value for the treatment of small quantities of such products as packed cocoa powder and spices.

Climatic factors.

(*See also* 1312-1325, 1627, 1628.)

1081. ANON.
The A.B.C. of rain making.
Rural Res. C.S.I.R.O., 1953, No. 5, pp. 16-17, illus.

Research begun by the C.S.I.R.O. in 1946 shows that, given suitable conditions, rain can be induced that would not otherwise have fallen, but that large-scale modification of rainfall is not at present an economic proposition in Australia. The dry-ice method is more suitable than the silver iodide method for Australian conditions; as used in south-eastern Australia it would give increases of 5–10% over a given area.

1082. MIDDLETON, J. T., KENDRICK, J. B., Jr., AND DARLEY, E. F.
Air pollution injury to crops.
Calif. Agric., 1953, **7** (11): 11-12, illus.

An earlier account of this work was abstracted in *H.A.*, 24: 45. This paper covers the same ground but contains some additional information. A number of tree, field, vegetable and ornamental crops are tentatively classified as susceptible or resistant to olefinic peroxides in smog. Leaf injuries caused by smog are illustrated in a few cases. Protection to glasshouse crops can be afforded by passing all incoming air through activated carbon filters.

1083. KENDRICK, J. B., Jr., MIDDLETON, J. T., AND DARLEY, E. F.
Predisposing effects of air temperature and nitrogen supply upon injury to some herbaceous plants fumigated with peroxides derived from olefins.
From abstr. in *Phytopathology*, 1953, **43**: 588.

Increasing the temperature from 13° to 24° C. for a week before fumigation resulted in greatly increased injury in spinach. Reducing the temperature from 24° to 13° C. for a week before fumigation reduced injury in lettuce to a trace, but reduction of temperature for less than 4 days conferred no tolerance to this type of air pollution injury. Plants with abundant N were injured very much more than N-deficient plants.

1084. Bleasdale, J. K. A.
Air pollution and plant growth.
Smokeless Air, reprinted in *J. Pk Adm.*, 1953, **18**: 300-1, bibl. 2.

In experiments at the University of Manchester supplying ryegrass grown in a greenhouse with air polluted with coal smoke reduced its growth by about 50% as compared with similar air supplied after the polluting gases had been removed. The results indicate that SO_2 was the gas responsible for depressing growth. These and other experiments show that the effects of pollution are much more severe in winter than in summer and hence those species such as wallflower, cabbage and ryegrass which are not dormant during the winter suffer the most. Air pollution increases the rate of leaf senescence, and some plants, e.g. forget-me-not, may fail to survive because new leaves are produced too slowly to replace those that have died.

1085. Middleton, J. T., Kendrick, J. B., Jr., and Darley, E. F.
Olefinic peroxide injury to bean as influenced by age, variety, chemical additions, and toxicant dosage.
From abstr. in *Phytopathology*, 1953, **43**: 588.

The extent and severity of injury to primary leaves of Pinto bean fumigated with olefinic peroxides increases as the age of leaves increases from 2 to 16 days. Damage to compound leaves of 16-day-old plants is greatest on the oldest and least on the youngest, with none apparent on terminal, unexpanded leaves. The extent of injury at a given concentration of toxicant is directly proportional to duration of fumigation. Varieties of *Phaseolus lunatus* and *P. vulgaris* respond differentially to the toxicant. Leaves may be protected from injury by aqueous sprays of manganese or zinc ethylenebisdithiocarbamate applied immediately before fumigation. Bordeaux does not protect when applied at concentrations of 3-3-100 and 6-6-100 but does when applied at 12-12-100. This suggests 2 mechanisms of protective action: direct chemical influence, and altered plant activity.

1086. Uhlig, S.
Berechnung der Verdunstung aus klimatologischen Daten. (**The computation of evapotranspiration from climatological data.**)
Mitt. dtsch. Wetterdienst., 1954, No. 6, pp. 24, bibl. 12.

For purposes of irrigation growers often require estimates of average evapotranspiration during a given period from a given, plant-covered soil. Several methods of computing these values from existing climatological data were compared at Bad Kissingen, and Albrecht's method, with some modifications, was found to give the most reliable results.

Biochemistry.

(*See also* 1145c, s, t.)

1087. Schenker, H. H., and Rieman, W. III.
Determination of malic, tartaric, and citric acids in fruit by ion exchange chromatography.
Analyt. Chem., 1953, **25**: 1637-9, bibl. 6.

A rapid (8 hours) procedure is described, in which the three acids are separated by ion exchange chromatography and then determined by oxidation with permanganate.—Rutgers Univ., New Brunswick, N.J.

1088. Bharucha, F. R., and Shankar, J. V.
A note on the "titratable acidity" in *Amaranthus spinosus* Linn.
Sci. and Cult., 1953, **19**: 261-2, bibl. 7.

The fluctuations of titratable acidity and reducing sugars in *Amaranthus spinosus* (sap, pH 6·1) were found to be opposite to those occurring in the Crassulaceae, to which the study of acid metabolism has so far been largely confined.—Inst. Sci. Bombay.

1089. Zechmeister, L., and Karmakar, G.
The occurrence of phytofluene in green plant organs.
Arch. Biochem. Biophys., 1953, **47**: 160-4, bibl. 5, being *Publ. Calif. Inst. Tech.* **1820**.

By means of an improved method, the presence of very small quantities of phytofluene was revealed in chlorophyll-containing tissues of all plants examined, viz. 21 species representing 18 families of vascular plants. [Authors' summary.]

Physiology.

(*See also* 1145w.)

1090. Felius, P. M., and Doorenbos, J.
De jeugdphase van houtige gewassen. (**The juvenile phase in woody plants.**)
Reprinted from *Vakbl. v. Biologen*, 1953, **33**: 205-12, bibl. 39.

The author discusses the question of juvenility, with reference to the literature, under the following headings: (1) Introduction; (2) An example: the juvenile phase in apple; (3) Localization of the juvenile phase. Rejuvenation; (4) The fixed juvenile form of conifers. Topophysis; (5) Can the juvenile phase be shortened?; and (6) Theories on the juvenile phase.

1091. Dore, J.
Seasonal variation in the regeneration of root-cuttings.
Nature, 1953, **172**: 1189, bibl. 2.

The annual fluctuation of regenerating capacity in raspberry root-cuttings noted by Hudson [*H.A.*, 24: 206, 1240 and 1241] was paralleled by observations on root-cuttings of horse-radish (*Armoracia rusticana*), the regenerating capacity of which was found to be low during the months of flowering (May and June). Evidence from the literature suggests that the antagonism between regenerating capacity and flowering is widespread.—Univ. Southampton.

1092. Schwemmle, B.
Über die tagesperiodischen Änderungen des Reaktionsvermögens von Keimpflanzen auf niedrige Temperatur. (**Diurnal variations in the response of seedlings to low temperature.**)
Planta, 1953, **43**: 98-132, bibl. 31, illus.

Seedlings of 7 short-day and 7 long-day species, kept at 24° C., were subjected to a temperature of 9° C. for 4 hours at various times during dark periods of 22, 20 and 16 hours. A detailed study was made of the effect of these combined photoperiodic and thermoperiodic treatments on (1) the elongation growth of the hypo-

cotyl, (2) the fresh and dry weight of hypocotyl and leaves, (3) the relative chlorophyll content of the cotyledons or leaves.—Univ. Tübingen.

1093. DE ZEEUW, D.
Flower initiation and light intensity in *Perilla*.
Reprinted from *Proc. kon. ned. Akad. Wetensch. Ser. C*, 1953, **56**: 418-22, bibl. 7, as *Publ. Lab. TuinbPlantent., Wageningen* **114**.

Experiments with the short-day plant *Perilla* have shown that flowering is possible in long days or even with continuous light, provided the light intensity is low enough. Absolute darkness is not necessary for flower initiation, but the longer the photoperiod the narrower is the light intensity range for flower initiation. These results support the theory that a flower-inhibiting substance is inactivated during the dark period.

1094. CHRISTENSEN, E.
Root production in plants following localized stem irradiation.
Science, 1954, **119**: 127-8, bibl. 4, illus.

Localized X-irradiation of the stem produced adventitious roots in seedling plants of several species. In *Xanthium* sp., the plant chiefly studied, a dosage of 1,500–12,000 r caused a slight chlorosis of the treated stem sector after about 2 weeks. At about 3 weeks the irradiated zone was decidedly narrower than the regions above and below it and some swelling occurred in the stem immediately above the irradiated area. In the fourth week the swollen region displayed small papules which developed into normal roots when a sufficiently humid environment was provided. The tops of plants cut through the irradiated region could be used as cuttings. The gross aspect of treated plants suggests that at the site of radiation a phloem block occurs which impedes downward transport. Roots were also induced by localized irradiation in *Nicotiana glauca* (6,000 r), *Lycopersicum esculentum* (24,000 r) and *Phaseolus* sp. (16,000 r).—Brookhaven nat. Lab., Upton, N.Y.

1095. SPARROW, A. H., AND CHRISTENSEN, E.
Tolerance of certain higher plants to chronic exposure to gamma radiation from cobalt-60.
Science, 1953, **118**: 697-8, bibl. 5.

The 31 species exposed to γ-radiation under greenhouse and field plot conditions included many horticultural plants. Differences in tolerance were found to be considerable, *Tradescantia paludosa* and *Lilium longiflorum* showing a mild stunting at a dose rate of about 20 r/day, while broccoli and gladiolus did not exhibit definite symptoms at dosages lower than 1,400 and 4,100 r/day respectively. The data suggest, among other things, that plants with large chromosomes have a higher sensitivity to chronic γ-irradiation than do most plants with small chromosomes.—Brookhaven nat. Lab., Upton, N.Y. [See also *H.A.*, 23: 3728.]

1096. GUNCKEL, J. E., AND OTHERS.
Variations in the floral morphology of normal and irradiated plants of *Tradescantia paludosa*.
Bull. Torrey bot. Cl., 1953, **80**: 445-56, bibl. 21, illus.

Abnormalities induced in *Tradescantia* by gamma irradiation with radioactive cobalt were quantitatively but not qualitatively different from those found in abnormal, non-irradiated plants. They ranged from almost complete inhibition of flower heads at high dosage levels to irregularity in form and number of floral parts and abnormal bud arrangement at low dosage levels.—Dep. Bot., Rutgers Univ., New Brunswick, and Biol. Dep. Brookhaven nat. Lab., Upton, N.Y. [See also *H.A.*, 23: 4488h.]

1097. MACFARLANE, E. W. E., AND MESSING, A. M.
Shoot chimeras after exposure to mercurial compounds.
Bot. Gaz., 1953, **115**: 66-76, bibl. 18.

Six methods of application of phenylmercuric hydroxide (PMOH) and phenylmercuric nitrate (PMN) to the shoot apex of two dicotyledons, *Coleus blumei* and *Raphanus sativus*, and three monocotyledons, *Zea mays*, *Anacharis canadensis* and *Ruppia maritima*, subsequently produced somatic changes in tissue. The concentrations were higher and the times of exposure usually longer than those tolerated by the roots. In radish the changes included dwarfing, hypertrophy, the occurrence of chlorophyll sectors in the cotyledons, and pollen sterility.

1098. VERDUIN, J.
A table of photosynthetic rates under optimal, near-natural conditions.
Amer. J. Bot., 1953, **40**: 675-9, bibl. 25.

A table of photosynthetic rates under optimal, near-natural conditions, prepared for the Handbook of Biological Data, is presented and discussed. Natural photosynthesis is best regarded as a process influenced by many factors, several of which have intensities lower than the saturating value. Plants in nature show photosynthetic and respiratory rates adapted to the factor intensities prevailing in their respective habitats. [From author's summary.]

1099. SHAW, M., AND MACLACHLAN, G. A.
Chlorophyll content and carbon dioxide uptake of stomatal cells.
Nature, 1954, **173**: 29-30, bibl. 9, illus.

The epidermal chlorophyll content of *Tulipa gesneriana* and the uptake of radioactive carbon dioxide by isolated epidermis of tulip, *Vicia faba* and *Allium cepa* have been determined in an attempt to gain new information on the mechanism of stomatal movement. —Univ. Saskatchewan.

1100. SPANNER, D. C.
On a new method for measuring the stomatal aperture of leaves.
J. exp. Bot., 1953, **4**: 283-95, bibl. 3, illus.

A method is described of following the behaviour of stomata by utilizing a diffusion phenomenon, the Dufour effect.

1101. YARWOOD, C. E.
Heat of respiration of injured and diseased leaves.
Phytopathology, 1953, **43**: 675-81, bibl. 21.

The temperatures of 10 g. green weight of detached

healthy leaves in vacuum cups reached 0·5–2·5° C. above air temperature in 4–20 hours. The observed leaf temperatures increased with further insulation, and with increased size of leaf sample, was greater for leaves taken late than for those taken early in the day, and was greater for leaves given an extra supply of sugar. Leaves which had been rubbed with carborundum or sprayed with lime-sulphur or bordeaux mixture reached a higher temperature than untreated leaves. Separate infection of leaves with 5 different viruses and 9 different fungi increased leaf temperatures by an average of 21% and 82% respectively. Only leaf curl-infected peach leaves showed a lower temperature than healthy leaves, probably an anomaly due to the low dry matter content of infected peach leaves. With diseased leaves the rise in temperature after leaves were placed in the vacuum cups and the fall in temperature after the maximum was reached were greater than for healthy leaves. Temperatures of rusted bean leaves rose clearly above that of healthy leaves at 5 days after infection, remained 44–228% above healthy leaves until 17 days after infection, and fell below that of healthy leaves with death of the leaves at about 19 days after infection. Since the killing of bean rust mycelium in living leaves did not cause a clear decrease in leaf temperature, it is tentatively concluded that the increased temperature is caused principally by host respiration rather than by the respiration of the pathogen. Rough calculations indicate that most of the energy of respiration of leaves under conditions of the tests is liberated as heat. [From author's summary.]—Dep. Plant Path., Univ. Calif., Berkeley.

1102. Åberg, B.
On the effect of different sugars upon the ascorbic acid content of detached leaves.
Ann. roy. agric. Coll. Sweden, 1953, **20**: 125-38, bibl. 34.

Detached parsley and oat leaves were fed in the dark with various sugars and the effect of the treatment on ascorbic acid content was studied. The results, however, allow no certain conclusions to be drawn on ascorbic acid precursors in biosynthesis.

1103. Byerrum, R. U., and Wing, R. E.
The rôle of choline in some metabolic reactions of *Nicotiana rustica*.
J. biol. Chem., 1953, **205**: 637-42, bibl. 13.

Tracer studies with C^{14} showed that the methyl carbons of choline could be transferred to give the methyl group of nicotine in *Nicotiana rustica*. The biological significance of this finding is discussed.—Mich. St. Coll.

Growth substances.

(*See also* 1145i, j, k, 1172, 1173, 1198-1201, 1284, 1299, Weeds and weed control section, 1590, 1596, 1677, 1799, 1884, 2026, 2099.)

1104. Bonde, E. K.
Auxins and auxin precursors in acid and non-acid fractions of plant extracts.
Bot. Gaz., 1953, **115**: 1-15, bibl. 39.

An account is given of experiments in which readily diffusible and easily converted precursors of indoleacetic acid and of a non-acidic growth substance were extracted from etiolated pea and cabbage tissue.—Calif. Inst. Tech., Pasadena. [See also *H.A.*, 23: 1503k.]

1105. Street, H. E.
Effects of alpha-(1-naphthylmethylsulphide)-propionic acid on the growth of excised tomato roots.
Nature, 1954, **173**: 253-4, bibl. 8, illus.

A study of the effects of NMSP on the growth of excised tomato roots in large volumes of medium suggests that a natural hormone, other than β-indolylacetic acid or β-indolylacetonitrile, controls the activity of excised tomato root meristems grown under specified conditions of culture.—Univ. Manchester.

1106. Reinders-Gouwentak, C. A., and Smeets, L.
Growth hormone relations in the tomato.
Reprinted from *Proc. kon. ned. Akad. Wetensch. Ser. C*, 1953, **56**: 354-8, bibl. 5.

The response of the pedicels of the first truss of tomato plants to NAA sprays shows that the main axis in the sympodium has the function of growth substance production and of a growth regulator. The inhibitors, ferulic acid and caffeic acid, if applied to second-truss pedicels in combination with NAA, had an antagonistic or a synergistic effect, depending on whether or not the experimental conditions allowed for a strong upward movement of the natural growth hormone. From this and other evidence it is concluded that ferulic and caffeic acids affect the transport of natural growth hormone. Coumarin invariably had an inhibiting action on the natural growth hormone or on NAA.—Lab. algem. Plantkunde, Wageningen.

1107. Rice, E. L., and Rohrbaugh, L. M.
Effect of kerosene on movement of 2,4-dichlorophenoxyacetic acid and some derivatives through destarched bean plants in darkness.
Bot. Gaz., 1953, **115**: 76-81, bibl. 6, illus.

An account is given of an investigation undertaken to resolve contrary findings regarding the movement of 2,4-D and derivatives through destarched plants in the dark. Movement was found to occur.—Univ. Oklahoma, Norman.

1108. Henbest, H. B., Jones, E. R. H., and Smith, G. F.
Isolation of a new plant-growth hormone, 3-indolylacetonitrile.
J. chem. Soc. Lond., 1953, pp. 3796-3801, bibl. 30.

3-indolylacetonitrile, appreciably more active than the corresponding acid in *Avena* cell-elongation tests, is present in about 0·0002% in cabbage, and has been isolated (crystalline) by employing partition and chromatographic techniques. This is the first isolation of a growth hormone from the leaves and stems of actively growing higher plants. [Authors' abstract. For an abstract of a preliminary account of this work in *Nature*, see *H.A.*, 22: 2078.]—Univ. Manchester.

1109. Mitchell, J. W., and Preston, W. H., Jr.
Secondary galls and other plant growth-modifying effects induced by translocated α-methoxyphenylacetic acid.
Science, 1953, **118**: 518-19, bibl. 4, illus.

The effects on cell proliferation and growth of α-methoxyphenylacetic acid (MOPA) and several related compounds were studied on beans, cucumbers, sunflowers, tomatoes, barley and maize. At the concentrations used MOPA had no apparent effect on the growth of maize and barley, but produced distinct responses in the other test plants. These responses included temporary stem curvature and leaf distortion, suppression of terminal growth, and both primary and secondary cell proliferation (gall formation). The primary galls were formed on the treated portion of bean stems and the secondary galls on the internode above. From a comparison between the effect of MOPA and phenylacetic acid, in which the latter showed similar growth-modifying activity and primary gall formation but no secondary gall formation, it would appear that the substitution of the methoxy group for hydrogen on the alpha carbon of phenylacetic acid produced a compound (MOPA) which may have been more readily translocated by the plant than was phenylacetic acid. The effects of chlorine substitution on the benzene ring of MOPA is now being investigated.

1110. (Mitchell, J. W., and Preston, W. H., Jr.)
MOPA moves through plant roots.
Agric. Res., 1954, **2** (7): 3-4, illus.

It has been demonstrated that MOPA (alpha-methoxyphenylacetic acid), unlike all other growth substances tested, can pass, apparently unchanged, from a treated plant to an untreated plant via the roots. When treated plants were grown in water and untreated plants were subsequently grown in the same water the latter soon showed abnormal growth responses. Similarly when plants of several species, including beans and cucumbers, were grown together the chemical moved from treated to untreated plants. It appears that this transfer occurs between roots that are in contact or at least are growing close to one another.

1111. Hoffmann, O. L.
Inhibition of auxin effects by 2,4,6-trichlorophenoxyacetic acid.
Plant Physiol., 1953, **28**: 622-8, bibl. 10, illus.

The inhibition of the effects on tomato of such structurally diverse growth regulators as 2,4-D, naphthaleneacetic acid, indoleacetic acid and 2-benzothiazolyloxyacetic acid suggests that they all affect similar processes in plants. This inhibition was reversible with large quantities of IAA, NAA, and BOA, indicating the possibility of a competitive antagonism. The results are similar to those obtained by van Overbeek with cinnamic acid [see *H.A.*, 22: 1153]. Auxin-controlled responses of plants inhibited by 2,4,6-T include epinasty, swelling of stems, negative geotropism of stems, orientation of leaves to light, and rooting of cuttings. Inhibition of axillary bud growth in plants has been attributed to the effect of a hormone from the terminal bud. Auxins such as IAA applied to the cut end of a decapitated plant have the effect of reducing axillary bud growth. Although 2,4,6-T inhibited other auxin-controlled responses, it did not reverse the influence of a terminal bud upon lateral bud growth in these tests. [From author's summary.]—Iowa State Coll., Ames.

1112. Lona, F., and Bocchi, A.
L'azione ipoauxinizzante delle sostanze fotodinamiche sulla pianta e relative manifestazioni morfogenetiche, organogenetiche, di correlazione e di differenziazione. (**The antiauxin-like action of photodynamic substances on plants and its morphogenetic and organogenetic effects.**) [English summary 15 lines.]
Nuovo G. bot. ital., 1952, **59**: 511-14, bibl. 10.

The effects of eosine on the short-day *Perilla ocymoides* var. *nankinensis* grown under long-day conditions were: (1) tendency to vertical growth in leaves; (2) reduced rate of growth in terminal buds and increased growth of laterals; (3) leaf abscission (which could be inhibited by simultaneous treatment with indoleacetic acid); (4) inhibition of rooting; and (5) bract-like form of new leaves.

1113. Phouphas, C.
Action de l'hydrazide maléique sur la teneur en substances glucidiques des tissus de topinambour cultivés *in vitro*. (**Effect of maleic hydrazide on the content of glucocidic substances in Jerusalem artichoke tissue cultivated *in vitro*.**)
Bull. Soc. Chim. Biol., 1952, **34**: 900-3, from abstr. in *Biol. Abstr., Sect. D*, 1953, **27**, No. 33025.

In certain concentrations maleic hydrazide inhibits inulin biosynthesis and increases sucrose accumulation.

1114. Nickell, L. G., and English, A. R.
Effect of maleic hydrazide on soil bacteria and other microorganisms.
Weeds, N. York, 1953, **2**: 190-5, bibl. 25.

In the experiments described maleic hydrazide was found to have little effect on the growth of microorganisms. Even the most sensitive organisms tested, certain strains of *Rhizobium*, were unaffected until levels of 280 p.p.m. and over were reached. All other bacteria were relatively unaffected until levels of 1,000 p.p.m. and over were reached. Since the levels used effectively on plants are lower in most cases than those which affect bacterial growth, it seems logical to assume that maleic hydrazide is a safe growth regulator.

Nutrition and manuring.

1115. Hope, A. B.
Salt uptake by root tissue cytoplasm: the relation between uptake and external concentration.
Aust. J. biol. Sci., 1953, **6**: 396-409, bibl. 18.

The proportion of a given length of [broad] bean root tissue which appears to reach the external concentration when placed in KCl solutions increases as the external concentration is increased. Experiments to determine the relationship between the apparent free space within the tissues and the external concentration of the solution indicate the presence of non-mobile ions (probably anions) in the cytoplasm of the root tissue. The relation between the uptake of KCl by bean root sections and the time of immersion has been found to follow Fick's law of diffusion. [From author's summary.]

1116. Hannay, J. W., and Street, H. E.
Studies on the growth of excised roots. III. The molybdenum and manganese requirement of excised tomato roots.
New Phytol., 1954, **53**: 68-80, bibl. 21, illus.
A study has been made of the manganese requirement of excised tomato roots, grown in a modified White's medium. A procedure is described whereby manganese and molybdenum deficiencies can be induced in this medium, and the interaction between these two elements studied. [From authors' summary.]

1117. Rediske, J. H., and Biddulph, O.
The absorption and translocation of iron.
Plant Physiol., 1953, **28**: 576-93, bibl. 12, illus.
Red kidney bean plants were grown in nutrient media with varying quantities of iron and phosphorus and at pH values ranging from 4·0 to 7·0 in an attempt to determine the factors associated with the absorption and translocation of iron in the plant. It has been shown that the iron salt used in the nutrient media exerts a very great effect on the association (absorbed and adsorbed) of iron with the root, but no correlation was found between the actual availability of iron to the aerial parts of the plant and (1) the precipitation rate of iron from nutrient solutions containing various iron salts, and (2) the amount of iron associated with the roots. As the hydrogen ion concentration of the nutrient solution increased, the iron uptake increased. The adsorbed iron on the root also increased. As the iron concentration in the nutrient solution increased, the iron absorption also increased. This was very marked at pH 4·0 but somewhat less pronounced at pH 7·0. It was found that a high concentration of phosphorus in the nutrient solution retards the uptake of iron. The mobility of iron depends primarily on the iron concentration of the tissues; the amount of phosphorus available to the plant and the pH of the nutrient media are of secondary importance. If the phosphorus concentration of the tissues becomes too high, a chlorosis may occur which is caused by the immobilization of iron in the veins of the leaf. The distribution of iron in healthy bean plants tends to be uniform with slightly greater concentrations in the growing points. The accumulation of iron on the roots from a nutrient solution is heavy and may account for a large percentage of that originally added to the solution. [From authors' summary.]

1118. Romney, E. M., and Toth, S. J.
Plant and soil studies with radioactive manganese.
Soil Sci., 1954, **77**: 107-17, bibl. 12, illus.
The absorption and distribution of Mn^{54} in tomato and other plants were studied in glasshouse experiments. The stems of both sunflowers and tomatoes contained less Mn^{54} than the leaves. Autoradiographs showed Mn^{54} concentrated in marginal and interveinal tissue in tomato leaves. When painted on tomato foliage Mn^{54} was absorbed through leaf, petiole and stem tissue and translocated to all parts of the plant, the tendency being for more to move upward than downward from the point of application to regions of active growth.—New Jersey agric. Exp. Stat.

1119. Rediske, J. H., and Selders, A. A.
The absorption and translocation of strontium by plants.
Plant Physiol., 1953, **28**: 594-605, bibl. 11.
There was found to be no significant redistribution of strontium within the leaf system of the bean plant grown at a pH of 6·0, even though favourable concentration gradients existed. The total amount of strontium which a trifoliate leaf will accumulate is proportional to the age of the leaf. However, each tissue appears to have a maximum total amount of strontium which it will accumulate for given nutrient conditions. This maximum accumulation is attained at some characteristic time before senescence, depending on the tissue. It was shown that the absorption of strontium is proportional to the concentration in the nutrient solution up to 100 p.p.m. This indicates that there is no deleterious effect of strontium concentration on the uptake mechanism below 100 p.p.m. The accumulation of strontium on the root decreases as the acidity is increased between pH 7·0 and 4·0. The ratio of leaf strontium concentration to root strontium concentration increases linearly as the pH decreases. It was found that tomato will maintain a concentration of strontium in its leaves, which is 39% of that found on the roots. The percentage for bean was 34; wheat, 28; and Russian thistle, 14.—Radiol. Sci. Dep., General Electric Company, Richland.

1120. Arnon, D. I., and Wessel, G.
Vanadium as an essential element for green plants.
Nature, 1953, **172**: 1039-40, bibl. 10.
Vanadium was shown to be indispensable in the nutrition of certain green algae. Like other micronutrients, the essentiality of which was first established for one plant species, vanadium is likely to be required by green plants generally.—Univ. Calif. Berkeley. [See also 1145 l.]

1121. Delmas, E.
pH et maladies de carence. **(pH and deficiency diseases.)**
Fruits d'Outre Mer, 1954, **9**: 16-21, bibl. 28.
A review article. The author concludes that deficiency diseases (major and minor element) are in general more common when the pH is below 6. Slight acidity aids the assimilation of most elements, and a pH of 6·5–7 and, in fairly humid to humid tropical soils, even of 6 is not injurious. Below that level, however, other factors act unfavourably for the development of plants and acidity may become harmful.

1122. Westerhof, J. J., and others.
De inundaties gedurende 1944-1945 en hun gevolgen voor de landbouw. Deel XIII. De bemesting op geïnundeerde gronden. **(The floods of 1944-1945 and their effect on agriculture. XIII. Manuring of inundated soils.)** [English and French summaries, pp. 2½ each.]
Versl. landbouwk. Onderz. **57.19**, 1951, pp. 62, bibl. 32 [received 1954].
Although cereals were used as test crops in these investigations, the results are likely to be of general interest to horticulturists. The following conclusions are drawn. After an inundation with slightly brackish

to very salt water, which has lasted more than 6–7 months, the amount of nitrogen in soils of good structure will be increased to the extent of 40–60 kg. N per ha. On acid, humic soils this N increase will be smaller. After inundations of less than 2 months the increase in N will be hardly noticeable. Generally there will be no need to change the normal phosphate dressing, but on humic, heavily decalcified clay soils the quantity of P_2O_5 applied should be 2 or 3 times as large as under normal conditions. Soils which have been flooded with salt water and contain 20% of particles <16 μ need no K manuring for some years, except for crops with a low K absorption capacity, such as kidney beans, onions and peas, which should receive a light dressing of K. On soils with 10–20% of particles <16 μ, moderate dressings of K should be applied to all crops. In soils which have been flooded with brackish or fresh water normal K dressings should be applied. [For earlier papers in this series, see *H.A.*, 22: 3326 and 23: 3750.]

1123. Chester, K. S.
Bacterial fertilizers?
Agric. Chemls, 1953, **8**: 32-3, 116, 118, bibl. 10, illus.

The author discusses the claims of Russian workers for "bacterins", i.e. cultures of bacteria capable of transforming insoluble P and K compounds in the soil into available plant nutrients. Plants for which data on their response to the treatment are tabulated include cabbage, tomato, cucumber and watermelon. In presenting this review the author hopes to stimulate soil scientists in the West to do research work on bacterial fertilizers.

Soil problems.

(*See also* 1145p, 2083, 2095.)

1124. Swanson, C. L. W.
Soil conditioners.
Sci. Amer., reprinted in *World Crops*, 1954, **6**: 31-3.

The present position and future outlook in the U.S.A. are discussed. The conclusion drawn from a study of a number of tests is that conditioners can stabilize the soil structure provided sufficient amounts are applied and thoroughly worked in. This achievement is capable of further development.

1125. (Wester, R. E., and Hopkins, H. T.)
Synthetic conditioners.
Agric. Res., 1954, **2** (8): 8-10, illus.

In trials at Beltsville on silt loam soils VAMA (partial calcium salt of vinyl acetate and maleic acid) and HPAN (sodium salt of hydrolysed polyacrylonitrile) have markedly improved the growth of several vegetable crops, and the use of these conditioners in vegetable gardens is now considered both practicable and economic.

1126. Anon.
Soil conditioners under trial.
Grower, 1954, **41**: 291.

A British synthetic resin soil conditioner, the equivalent of Krilium, is being tested at the Yorkshire Institute of Agriculture, Askham Bryan. Rainfall was well distributed throughout the test and the conditioner caused no marked increase in the yield of the test crop, lettuce. The physical condition of the soil was markedly improved. Germination of seeds on the treated soil was good.

1127. Shuel, R. W., and Shivas, J. A.
The influence of soil physical condition during the flowering period on nectar production in snapdragon.
Plant Physiol., 1953, **28**: 645-51, bibl. 9.

The physical state of the soil during the flowering period was found to influence both yield and sugar concentration of nectar in snapdragon. In very dry or imperfectly aerated soil, yield was reduced and concentration increased; in drying soil of more than 25% available water and in cold soil yield was reduced but concentration was not affected. Yield reductions may have been due in part to restrictions in the sugar supply to the flower. The cause of variation in nectar concentration is not apparent. Secretion was observed to continue in severely wilted plants for as long as the flowers remained turgid. [Authors' summary.]—Ontario agric. Coll., Guelph.

Irrigation.

(*See also* 1145o.)

1128. Kidder, E. H., and Davis, J. R.
Supplemental irrigation on sandy soils in Michigan.
Agric. Engng St. Joseph, Mich., 1953, **34**: 761-5, 8, bibl. 13.

In experiments conducted by the horticultural department of Michigan State College the highest vegetable yields were obtained on plots irrigated when moisture block measurements indicated that 50% of the available water had been removed. In 1951 irrigation increased tomato yields by 25%, lima bean by 23% and broccoli by 10%; sweet corn, cabbage and cauliflower did not respond to irrigation in these trials. Notes are also given on frost protection, particularly of strawberry blossom, by sprinkler irrigation, but no definite recommendations are made.

1129. Barr, W. L., and Thomas, D. W.
Irrigation on Pennsylvania farms.
Bull. Pa agric. Exp. Stat. **562,** 1953, pp. 30, illus.

Water supply, irrigation equipment, operation and costs thereof are discussed. The crops irrigated included apples, tobacco, and canning tomatoes and peas.

1130. Schwalen, H. C., Frost, K. R., and Hinz, W. W.
Sprinkler irrigation.
Bull. Ariz. agric. exp. Stat. **250,** 1953, pp. 41, illus.

Sprinkler irrigation with special reference to Arizona is discussed. The advantages and disadvantages of sprinkling are discussed. Other subjects covered are types of sprinkler system (nozzle-line, perforated pipe and rotating-sprinkler), planning the system, and costs.

1131. Novikov, V.
Irrigation with waste water. [Russian.]
Kolhoz. Proizv., 1953, No. 12, pp. 13-14, illus.

The value of waste water, effluents, sewage, etc., from

towns and factories, for irrigation is discussed, and the lay-out of such an irrigation installation is schematically illustrated. Examples are given showing how irrigation with such water, both with and without the addition of fertilizers, increased yields of cabbage, tomato, carrot and some agricultural crops.

Glasshouses and air-conditioned structures.

(*See also* 1495-1498, 1504, 1516, 1647e, n, 2105.)

1132. Reinhold, J.
Zur Frage des nächtlichen Heizstoffbedarfes einer Gewächshausanlage. (**Fuel requirements of glasshouses at night.**)
Arch. Gartenb., 1953, **1**: 7-19, bibl. 2, illus.

A formula has been worked out which expresses the hourly coke requirements of a glasshouse boiler under a variety of environmental conditions.—Inst. f. Gartenb., Grossbeeren.

1133. Businger, J. A.
Resultaten van verwarmingsproeven in de stookkassen. (**Results of heating experiments in hothouses.**) [English summary 6 lines.]
Meded. Dir. Tuinb., 1954, **17**: 26-30, illus.

In a trial at the Institute of Horticultural Engineering, Wageningen, the effectiveness of 4 different types of glasshouse heating were compared: (1) warm air heating, (2) warm water with natural circulation, (3) steam heating and (4) warm water with forced circulation. The heat supply and consumption are compared. [See also *H.A.*, 24: 500.]

1134. Barnard, G. K.
Precision propagation. 2. Panel method of thermal insulation.
Comm. Gr, 1954, No. 3031, p. 180.

The theory of insulating glasshouses against heat loss is discussed. As about 77% of the heat loss during winter occurs during the night, and as any form of insulation will reduce the light intensity in the glasshouse, insulation should only be used at night. It must therefore be in a form that can be handled easily and of light material. Panels of plastic covered on the inner surface with aluminium foil are considered suitable. It is suggested that this form of insulation should be given preliminary tests in propagating houses. Figures are given showing that insulated houses would require only one-third as much heat as non-insulated ones.

1135. van Keulen, W.
De constructie van de klimaatschurr. (**The construction of the air-conditioned shed.**) [English summary 6 lines.]
Meded. Dir. Tuinb., 1954, **17**: 23-6, illus.

The author discusses the requirements with which building and insulating materials used in the construction of an air-conditioned shed should comply. He deals with the use of such materials and briefly surveys the properties of some insulating materials.

1136. Spoelstra, P. A.
Verwarming, bevochtiging en ventilatie in de klimaatschuur. (**Heating, humidification and ventilation of the air-conditioned shed.**) [English summary 10 lines.]
Meded. Dir. Tuinb., 1954, **17**: 17-22, illus.

Factors affecting the atmospheric conditions in an air-conditioned shed and the regulation of the internal climate are discussed. The suitability of various building materials and finishing coatings is being tested at the Institute of Horticultural Engineering, Wageningen. Details are given of air movement in various compartments.

1137. Fisher, F. J. F.
A humidity-control system for air-conditioned cabinets.
N.Z. J. Sci. Tech., Sect. B, 1953, **35**: 279-83, illus.

Two controlled-environment cabinets have recently been constructed at the University of Otago for studies of the New Zealand *Ranunculi*. By using a more powerful refrigeration system than is normally required for temperature control alone, a wide range of humidity control has been achieved. Use has been made of indirect thermostatic control of humidity as an alternative to direct control using cellophane-ribbon humidistats. Light intensities up to 850 foot-candles are available. [Author's summary.]

1138. Anon.
The use of electric discharge lamps for horticulture in glasshouses.
Philips Electrical Ltd., London, undated, pp. 8, bibl. 3, illus.

Following a brief discussion on the principles underlying the use of supplementary light for glasshouse crops and on the types of electric lamp used by various investigators, experience gained at the John Innes Horticultural Institution on tomatoes and methods used by cucumber growers in Holland are outlined. The most suitable sources of light are mercury electric discharge lamps MA 400 W. and fluorescent lamps MCF/U 80 W. 5 ft. and 40 W. 4 ft. Some details of installation and costs are given.

Machinery and apparatus.

(*See also* 1067, 1283, 1438, 1517, 1624, 1673, 1880, 1883.)

1139. Anon.
1,400 soil blocks per hour.
Comm. Gr, 1953, No. 3024, p. 1172, illus.

A new, electrically operated, soil block machine, is described. It can make over 1,400 blocks per hour, of 2, 2½ or 3 in. size, will operate for 9 hours on 1 unit of electricity, and is self-cleaning. The cost is £125.

1140. Černys, A. I.
The composition of soil blocks for raising seedlings. [Russian.]
Sad i Ogorod, 1953, No. 12, pp. 17-19.

Soil blocks made of a single soil mixture are not considered suitable for all vegetables. In trials with melons and watermelons the earliest and highest yields were obtained when the plants were raised in blocks made of a mixture consisting of equal parts of well rotted dung, turf and forest soil, to which fresh cow dung was added at the rate of 4% of the total mixture, and clean river sand at the rate of 5–10%. In addition, to every kg. of this mixture 1·5 g. of 40% potassium chloride and 5 g. of superphosphate were added.

1141. GORBATOV, P. P.
Mechanization of the production of soil blocks from peat and well-rotted dung. [Russian.]
Sad i Ogorod, 1953, No. 12, pp. 14-16, illus.

Two block-making machines are described and illustrated. The larger one, driven by an electric motor and served by 5 people, can produce $6\times6\times6$ cm. square or hexagonal and $8\times8\times8$ cm. square blocks from a mixture of peat and dung at the rate of 9,000 and 5,000 blocks per hour respectively. The smaller, portable machine, handled by 2 men, produces 4,000–5,000 blocks per hour.

1142. ANON.
New portable pot cleaning machine.
Comm. Gr, 1954, No. 3029, p. 68, illus.

Mention is made of a new portable pot cleaning machine. It is powered by a ¼ h.p. electric motor, can clean 500 pots an hour and has 3 easily interchangeable brushes to cover all sizes.The price is £35 10s.

1143. NORTHCRAFT, R. D.
A technique for removal of aseptic cylinders from carrot root.
Plant Physiol., 1953, **28**: 746-7, bibl. 1, illus.

The apparatus consists of a pair of razor blades rigidly held about 3 mm. apart. Notes are given on its use.

1144. BLACKMAN, G. E., BLACK, J. N., AND MARTIN, R. P.
Physiological and ecological studies in the analysis of plant environment. VIII. An inexpensive integrating recorder for the measurement of daylight.
Ann. Bot. Lond., 1953, **17**: 529-37, bibl. 17, illus.

The design is based on the principle that changes in the current passing through a vacuum emission cell, induced by variations in the light quanta received, control the rate of charge of a condenser. When the striking voltage of a discharge tube is reached the resultant flow of current energizes an electromagnetic relay which, in turn, is connected with a Post Office counter. In order to eliminate possible errors due to changes in temperature, the compartment containing the discharge tube is kept at a constant high temperature (100° F.), while a stabilized mains source of electricity is used. A ground-glass diffusing dome is used and a filter to exclude infra-red and ultra-violet radiation. With a photometric cell of relatively uniform sensitivity in the visible spectrum the recorder gave a linear response up to the maximum intensity investigated. No change in the calibration factor occurred in two summers' continuous use in the open. The electrical components, including the photo-electric cell, cost *ca.* £25, while the construction only demands normal workshop facilities. [Authors' abstract.]

Noted.

1145.

a ANON.
Selected list of American agricultural books.
Library List U.S. Dep. Agric. **1**, revised 1952, pp. 19 [received 1954].

b ANON.
Pubblicazioni inerenti il miglioramento genetico delle piante da frutto e da orto e problemi di tecnica colturale. **(Publications on fruit tree and vegetable breeding and cultivation problems.)**
Riv. Ortoflorofruttic. ital., 1953, **37**: 518-26.
By the University of Florence since 1929.

c BECKER, T.
Wuchsstoff- und Säureschwankungen bei *Kalanchoe blossfeldiana* in verschiedenen Licht-Dunkelwechseln. **(Variations in growth substance and acid content in *Kalanchoe blossfeldiana* under different light–darkness conditions.)**
Planta, 1953, **43**: 1-24, bibl. 46.

d BIDWELL, R. G. S., KROTKOV, G., AND REED, G. B.
Synthesis of radioactive glutamine from $C^{14}O_2$ in Swiss chard leaves and its isolation by paper chromatography.
Arch. Biochem. Biophys., 1954, **48**: 72-83, bibl. 10.

e EGGMAN, L., SINGER, S. J., AND WILDMAN, S. G.
The proteins of green leaves. V. A cytoplasmic nucleoprotein from spinach and tobacco leaves.
J. biol. Chem., 1953, **205**: 969-83, bibl. 13.

f ELANDT, R.
Zastosowania analizy wariancyjnej do złożonych zagadnień sadowniczych. **(Application of the analysis of variance to complex fruit growing experiments.)** [English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (2): 107-29.

g (GILMOUR, J. S. L.)
International code of nomenclature for cultivated plants.
J. nat. Inst. agric. Bot., 1953, **6**: 494-500.
A simplified and condensed version of the recently published code [see *H.A.*, 23: 3703].

h GILMOUR, J. S. L.
The new code for the naming of cultivated plants.
J. roy. hort. Soc., 1954, **79**: 12-21.

i GREULACH, V. A., AND ATCHISON, E.
Inhibition of mitosis in bean buds by maleic hydrazide.
Bot. Gaz., 1953, **114**: 478, bibl. 5, illus.

j GREULACH, V. A.
Notes on the starch metabolism of plants treated with maleic hydrazide.
Bot. Gaz., 1953, **114**: 480-1, bibl. 9.
Bean and tomato were used as test plants.

k HACKETT, D. P., AND THIMANN, K. V.
The effect of auxin on growth and respiration of artichoke tissue.
Proc. nat. Acad. Sci., 1952, **38**: 770-4, from abstr. in *Biol. Abstr., Sect. D*, 1953, **27**, No. 30696.

l HOPKINS, D. P.
Vanadium an essential nutrient?
World Crops, 1954, **6**: 31, bibl. 7.
See also abstract 1120.

m KNAPP, R., AND LINSKENS, H. F.
Beobachtungen über den Einfluss einiger mediterraner Pflanzengesellschaften auf Mikroklima und Bodenfeuchtigkeit. (**Observations on the influence of some Mediterranean plant associations on micro-climate and soil moisture.**)
Angew. Bot., 1953, **27**: 48-69, bibl. 39.
The plants considered included wild *Cistus* spp., *Andropogon hirtus*, tomato, vine and fig.

n KREĬCBERG, V. E.
The use of methyl bromide for the control of pests of botanical collections. [Russian.]
Bot. Žurnal, 1953, **38**: 570-3, bibl. 2.

o PILLSBURY, A. F., AND TAYLOR, E. H.
Hydraulic characteristics of pipe systems for irrigation enterprises.
Agric. Engng St. Joseph, Mich., 1953, **34**: 837-40, 842, bibl. 5, illus.
A discussion of both open and semi-closed pipe systems commonly used.

p RUSSELL, J. C.
The development of soil fumigation equipment.
Proc. Soil Sci. Soc. Fla 1952, **12**: 54-7, illus.
Tractor-mounted Insco pressure equipment.

q SMALLWOOD, N. W. (Compiler).
Horticultural organizations of the United States and Canada.
Library List U.S. Dep. Agric. **16,** revised 1952, pp. 13 [received 1954].
Names and addresses.

r SMALLWOOD, N. W. (Compiler).
Commercial horticultural organizations of the United States and Canada.
Library List U.S. Dep. Agric. **17,** revised 1952, pp. 8 [received 1954].
Names and addresses.

s SPORER, A. H., FREED, S., AND SANCIER, K. M.
Paper chromatography of chlorophylls.
Science, 1954, **119**: 68-9, bibl. 1.

t TEGETHOFF, B.
Zur papierchromatographischen Identifizierung von Vitamin C in pflanzlichen Substanzen. (**The identification of vitamin C in plant substances by paper chromatography.**)
Z. Naturf., 1953, **8b**: 374-6, bibl. 24, illus.

u THOMAS, M., AND RANSON, S. L.
Physiological studies on acid metabolism in green plants. III. Further evidence of CO_2-fixation during dark acidification of plants showing Crassulacean acid metabolism.
New Phytol., 1954, **53**: 1-27, bibl. 18, illus.; addendum pp. 28-30, bibl. 6.
Test plants *Kalanchoe*, *Opuntia*, *Sedum*, *Crassula*, *Kleinia* and *Agave lurida*.

v WANG, C. H., HANSEN, E., AND CHRISTENSEN, B. E.
Conversion of C^{14}-labeled acetate to citric and malic acids in the tomato fruit.
Plant Physiol., 1953, **28**: 741-5, bibl. 12.

w WAREING, P. F., AND CARR, D. J.
Some recent experiments bearing on theories of photoperiodism.
Proc. Linn. Soc. Lond. 1951/52, 1953, **164**: 134, bibl. 4.
See also *H.A.*, 22: 3280.

TREE FRUITS, DECIDUOUS.

General.

(*See also* 1063, 1064, 1078, 1145b, f, 1236c, e, h, j, l, p, 2110, 2111, 2117, 2119a.)

1146. COMMONWEALTH ECONOMIC COMMITTEE.
Fruit. A summary of figures of production and trade relating to fresh, canned and dried fruit, and wine.
[*Publ.*] *Commonw. Econ. Cttee*, 1953, pp. 160, 5s.

This review, issued annually, contains tables and summaries of production by countries and international trade during the last pre-war and recent years, up to 1952, for the following: apples, pears, plums, cherries, peaches, apricots, grapes, pineapples, oranges, grapefruit, lemons, bananas, canned fruits, raisins and currants, dried tree fruits and wine. In 2 appendices details are given of import duties and trade regulations, and government measures affecting the import of fruit into the United Kingdom.

1147. INGRAM, J.
Report of the fruit department at Luddington.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 7-22.
The total experimental area under fruit now covers 36 acres. Planting of apples, black currants, gooseberries, plums and strawberries was started in 1950/51. Details are given of the lay-out of trials, some coming under the National Fruit Trials scheme, already started.

1148. IGNATIUS, J. G. W.
Geeft de jaarlijkse landbouwtelling een juist beeld van het fruitteelt-areaal? (**Does the annual agricultural census accurately reflect the area under fruit?**) [English summary 9 lines.]
Meded. Dir. Tuinb., 1953, **16**: 882-5.

So far as mixed plantations are concerned, the figures for the area under fruit in the Netherlands, as embodied in the outcome of the annual agricultural census of the Central Bureau of Statistics, are generally based on estimates. In order to investigate how far these estimates are correct, the area under fruit of a sample of 900 farms has been measured. The estimated area was found to deviate 0·7% from the measured area, whereas the total area, calculated from the random test, deviated only 1·6% from the actual area. The

author is therefore satisfied with the reliability of the annual census figures for the area under fruit. [From author's summary.]

1149. Gayford, G. W.
Apple growing in Victoria.
J. Dep. Agric. Vict., 1953, **51**: 489-92.
The Victoria apple crop averages 1·8 million bushels a year with a range of 1–3 millions. Gravenstein is the most popular early dessert variety, while Jonathan, Granny Smith and Delicious are the foremost mid-season varieties. Northern Spy, the chief rootstock, is not always satisfactory for Granny Smith, which appears to make better growth on seedling stocks. Notes are given on growing, production and varieties in the different centres, and on pollination.

1150. Desgraz, A., and others.
Le pêcher. (**The peach.**)
Rev. romande Agric. Vitic., 1954, Vol. **10**, No. 1, pp. 8, bibl. 6, illus.
This issue of the *Revue* is entirely devoted to peach growing in French-speaking Switzerland and Tessin and contains an introduction and 6 articles. The subjects covered include soil and climatic requirements, varieties, rootstocks, training and pruning, pest and disease control, and recent experience in Tessin.

1151. Visschers, A. J.
De perzikteelt in Limburg. (**Peach growing in Limbourg.**)
Fruitteelt, 1954, **44**: 72-3, 96-7, 154-5, 159, illus.
Peach growing in the open is rapidly on the increase in Limbourg. An account is given of soils, pests and diseases and varieties. A table shows the yields of different varieties on Wassenberger seedling and Kroosjes Yellow rootstocks.

1152. Malucelli, P.
Incremento gelsicolo e iniziative bacologiche nelle regioni dell'Italia centro-meridionale. (**Expansion of mulberry growing and silkworm raising in south-central Italy.**) [English summary 9 lines.]
Ann. Sper. agrar., 1954, Vol. **8**, No. 1, *Suppl.* pp. I-XII, bibl. 1.
Notes are given on work done at the mulberry growing and silkworm raising experimental station at Ascoli Piceno in 1951/52 and 1952/53.

Breeding and varieties.

(*See also* 1236k.)

1153. Mori, H.
Studies on the inheritance of the main characters of deciduous fruit trees. [Japanese, with English summary 3 pp.]
Bull. nat. Inst. agric. Sci. Hiratsuka (*Ser. E*) **2**, 1953, pp. 68, bibl. 10.
During many years' breeding work the genetics of the following characters were studied: (1) *Peach:* colour and texture of flesh, adhesion of flesh to stone, time of ripening, size of flower, leaf glands, ratio of multiple buds to single buds, and tree habit. (2) *Japanese pear:* skin colour, texture of flesh, juiciness, sugar content, time of ripening, shape and size of fruit. (3) *Persimmon:* astringency, tannin content and fruit shape.

1154. Granhall, I.
X-ray mutations in apples and pears.
Reprinted from *Hereditas*, *Lund*, 1953, **39**: 149-55, bibl. 8, illus.
A series of X-ray induced vegetative mutations have been produced at Balsgård in pears and apples. The present paper gives a description of six of these mutants, namely, green-yellow striped and brown russeted fruits of Esperens Herre pear, foliage chlorophyll defects in a form of Williams' pear, and three cases of red Gravenstein apple. The vegetative X-ray mutations have the structure of sectorial chimaeras. Whether they are also periclinal chimaeras remains to be investigated. From the plant breeder's point of view the results hitherto obtained seem very encouraging and the experiments are being continued on a broader basis. [Author's summary.]—Balsgård Fruit Breeding Inst., Sweden.

1155. Poruckiĭ, Ju, V., Halabuda, L. P., and Alekseenko, R. D.
Variability of anatomical and physiological characters in the progeny of vegetative hybrids in relation to conditions of growth. [Russian.]
Agrobiologija, 1952, No. 5, pp. 67-74, bibl. 3, illus.
Some seedlings of Bergamotte Reinette apple grafted on Bergamotte pear resembled apple, others pear trees. The plants resembling pears were raised from seed which was left in cold-stored fruit till sowing time, and the dominance of the type was intensified when the young plants were grown under inadequate moisture conditions. Plants resembling apples were raised from stratified seed and the dominance was again intensified by lack of moisture.

1156. Schmidt, M.
Beiträge zur Züchtungsforschung beim Apfel. II. Morphologisch-pomologische Studien an F_1-Sämlingen der Kreuzung einer Kultursorte mit *Malus niedzwetzkyana*. (**Breeding investigations with apples. II. Morphological-pomological studies on F_1 seedlings from the cross of a scion variety with *Malus niedzwetzkyana*.**)*
Züchter, 1953, **23**: 327-34, bibl. 8, illus.
Leaf colour and flower and fruit characteristics are described of F_1 seedlings from a cross of the apple variety Ernst Bosch with *Malus niedzwetzkyana*, a species with exceptionally red fruits and a high anthocyanin content in flower, foliage, wood and bark. The hybrids are of ornamental value and some of them are promising pomologically, though the quality of the fruits needs further improvement. High frost resistance is another interesting characteristic.—Inst. Obstb. Obstzüchtung Marquardt nr. Potsdam.

1157. Haritonova, E. N.
The effect of age of mother plants on quality of hybrids. [Russian.]
Agrobiologija, 1952, No. 4, pp. 147-50, bibl. 10, illus.
In breeding work with cherries it was found that when the female parent was 5–6 years old the resultant hybrids were more hardy and produced higher yields

* For an abstract of Part I see *H.A.*, 19: 91.

and more viable seed than when the female parent was 12–14 years old.

1158. Venjjaminov, A. N.
Clonal selection of cherry. [Russian.]
Agrobiologija, 1952, No. 5, pp. 45-58, bibl. 1, illus.
A discussion of the method of clonal selection of cherries used at the Horticultural Research Institute, Mičurinsk, as instanced by the variety Ljubskaja.

1159. Brooks, R. M., and Olmo, H. P.
1953's new fruit varieties.
Amer. Fruit Gr, 1954, **74** (1): 26-7, 43-6.
The tenth *Register of New Fruit and Nut Varieties* contains brief descriptions of 1 almond, 7 apples, 1 avocado, 1 rust-immune black currant, 4 blueberries, 1 grape, 8 nectarines, 11 peaches, 1 pear, 1 pecan, 3 persimmons, 5 raspberries, 6 strawberries and 5 walnuts.

1160. Hinrichs, H. A.
A summary of apple and peach variety trials in Oklahoma.
Bull. Okla agric. Exp. Stat. **B-410**, 1953, pp. 19.
This bulletin summarizes the yield performances of 71 apple varieties over a period of 13 to 14 years and of 110 peach varieties over a period of 10 to 16 years. With both species there were very marked differences in yield between different varieties. With peaches these differences were accentuated by variations in susceptibility to spring frosts. Brief descriptions are given of 12 of the apple and 33 of the peach varieties.

1161. de Wet, A. F.
Apple varieties.
Decid. Fruit Gr, 1953, **3** (12): 14-17.
Notes are given on present varietal distribution in commercial orchards in the Western and South-western Districts of the Cape Province and on promising lesser-known varieties. Scope exists for more red and more early apples.

1162. Roulon, F., and Chollet, P.
Comportement des variétés de pommes françaises et americaines en observation à Rennes depuis 1936. (**The performance of some French and American apples under observation at Rennes since 1936.**)
Pomol. franç., 1953, **80**: 127-36.
Notes are given on rootstocks, training and a number of varieties. After a consideration of the various factors on which choice of variety depends the opinion is expressed that 2 types of eating apple should be grown in France, "extra" quality varieties for export and limited local consumption and "commercial" quality for general consumption. Reinette d'Armorique is recommended as an apple in the second category for the Rennes district.

1163. Gerritsen, J. D.
Opbrengstgegevens. (**Yield data.**)
Fruitteelt, 1953, **43**: 966-7, illus.
Tables and graphs are given showing the yields and financial returns from 9 apple varieties on M.XVI or M.XIII stock planted in 1937 in the Geldermalsen trial grounds. The economic value of each variety is briefly discussed. It is concluded that Sterappel comes into bearing too late to be economic in a modern orchard. Schöner von Nordhausen, Princesse Noble and Early Victoria are either too unproductive or fetch too low a price to be economic, Manks Codlin comes into bearing very early, crops well and fetches a fair price, Glorie van Holland and Allington Pippin have given very satisfactory results, and Bramley's Seedling gives an outstandingly heavy crop and is recommended where extensive planting is possible and a cold store available.

1164. Mann, A. J., and Keane, F. W. L.
The Sam cherry.
Fruit Var. hort. Dig., 1953, **8**: 43-4, illus.
The cherry variety Sam, originating from a seedling of Windsor at the Summerland Experiment Station, B.C., is comparable to Bing in tree hardiness. Although a heavy June drop is characteristic of the variety, it produces an abundance of good-sized black fruits.

1165. Thompson, A. H., Vierheller, A. F., and Dunbar, C. O.
An unstable mutation of the Shippers Late Red peach.
Fruit Var. hort. Dig., 1953, **8**: 39-40, bibl. 2, illus., being *Misc. Publ. Md agric. Exp. Stat.* **178**, *Contr.* **2485.**
In 1945 a branch of Shippers Late Red peach tree was observed to produce smooth-skinned, nectarine-type fruits as well as normal pubescent peaches. Budwood from it was worked onto seedlings in 1948. In 1953, the second year of bearing, some trees produced no nectarine-type fruits, while others bore both smooth and pubescent fruits. All but one of the nectarine-type fruits, however, exhibited both pubescent and smooth areas of skin on the same fruit, a phenomenon which was not observed on the original mutation.

1166. Moretti, A.
Le prugne da essiccare. (**Prunes.**)
Ital. agric., 1953, **90**: 733-41, bibl. 2, illus.
Notes are given on current Italian production, localities (chiefly Campania and Trentino-Adige), acreages, exports and 9 early-, midseason- and late-flowering varieties of French, American and local origin cultivated in the hilly district of Conegliano. The best are French Improved and Sergeant followed by Agen and Italia. For an effective and rapid increase in prune production the thousands of wild trees of the low-yielding Cespa and Amoli di Suria should be grafted with a better variety. Breeding and selection are also recommended.

Propagation and rootstocks.

(*See also* 1236f, n, o, 1307, 1308.)

1167. Hatipov, Š. E., and Hatipov, A. E.
Stratification trials with fruit seeds. [Russian.]
Sad i Ogorod, 1953, No. 11, pp. 65-8, bibl. 1.
Clean sand is recommended as the best stratifying material and should be mixed with pome fruit seed in the ratio of 4 sand: 1 seed by volume, and with stone fruit seed in the ratio of 5: 1. The time required for the satisfactory stratification of pome and stone fruits and walnuts is given. The optimum time for sowing in

Uzbekistan is discussed, the authors being generally in favour of spring sowing of pome fruit seed and autumn sowing of stone fruit seed, both previously stratified.

1168. Arisumi, T.
The germination of early peach seeds.
From abstr. in *Rep. Ill. agric. Exp. Stat. 1950-52*, 1953, p. 105.

Immediate stratification of seed from early peach varieties resulted in better germination than stratification after dry storage, but was less effective than embryo culture. The stratifying media did not significantly affect germination percentage; Douglas fir and white pine sawdust, however, produced the cleanest seed. Seed from varieties and seedlings maturing 48 to 60 days before Elberta at Olney, Illinois, in 1950, were completely non-viable and did not germinate even when embryo-cultured. Seed from later varieties and seedlings showed highly significant differences between viability and germination percentages. In general, viability percentages of later varieties were significantly higher than germination percentages.

1169. Wierszyłłowski, J., and Katulska, C.
Wywoływanie korzeni bocznych u siewek jabloni bez pikowania. **(Root branching induced in apple seedlings without transplanting.)** [English and Russian summaries ¾ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (3): 107-16, bibl. 5, illus.

The effect of growth substances on root branching in seedlings of the apple variety Antonovka raised in nutrient solution was studied at the Poznan Agricultural College, Poland. In one set of experiments stratified seed was soaked for 24 hrs in different concentrations of the potassium salt of α-naphthaleneacetic acid and the potassium salt of β-indolebutyric acid, while in another set of experiments the same materials were added directly to the nutrient solution. The growth substances applied by either method promoted root branching. Optimum concentrations for the seed soaking treatment were 40–250 mg. indolebutyric acid or 20–125 mg. NAA per litre. When the growth substances were added to the nutrient solution 0·5 mg. per litre of either material was found most satisfactory.

1170. Säkö, J.
Siemenperusrunkojen vaikutus omenapuiden satovaihteluihin. **(The influence of seedling rootstocks on the cropping of apple trees.)** [English summary ½ p.]
Maataloust. Aikakausk., 1953, **25**: 160-70, bibl. 12.

Yields of apple varieties on seedling rootstocks of known origin were recorded for periods of 15–21 years from planting. Although there was much variation from year to year, total yields of a variety were fairly uniform, irrespective of rootstock used. Directly comparable data are not available, but it appears that the trees cropped much more uniformly than those worked on EM rootstocks, probably owing to the greater frost resistance of the seedling rootstocks.—Piikkio.

1171. Rebandel, Z.
Przyczynek do badań nad jednolita i mieszaną uprawą dziczkow w szkółce. **(Separate and mixed culture of seedlings in the nursery.)** [English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (4): 129-33, bibl. 6.

Contrary to experience elsewhere, apple and pear seedlings did not grow any better when mixed than in pure apple or pear stands.

1172. Graham, S. O.
Propagation of leafy cuttings of *Prunus mahaleb* with adenine and indolebutyric acid.
From abstr. in *Phytopathology*, 1953, **43**: 587.

Three-inch leafy cuttings were momentarily immersed in a solution containing a wax-based, anti-transpirant, 1,000 p.p.m. urea, 5,000 p.p.m. sucrose, 25 p.p.m. thiamine and 25 p.p.m. nicotinic acid. When dry the bases of the cuttings were soaked for 4 hours in 200 p.p.m. adenine, followed by a dip in 3,000 p.p.m. indolebutyric acid in talc and the cuttings were set. One hundred per cent rooting occurred in 3 weeks with an average of 19 roots per cutting. Similar treatments without adenine produced 40% rooting in 3 weeks and 80% rooting in 6 weeks with an average of 8 roots per cutting. When neither adenine nor indolebutyric acid were used in treatments, no rooting response was demonstrated in 6 weeks. Treated cuttings in all cases remained as fresh as when first taken with no leaf abscission or chlorosis. Similar tests excluding the anti-transpirant-nutrient pre-treatment showed death to all cuttings before any rooting occurred.

1173. Moretti, A.
Le eteroauxine nella moltiplicazione del gelso. **(Growth substances in the propagation of mulberry.)** [English summary 10 lines.]
Riv. Fruttic., 1954, **16**: 1-17, bibl. 13, illus.

A number of root-promoting substances were used in experiments in mulberry propagation from cuttings at Conegliano in 1951, 1952 and 1953. They had little effect on one of the two varieties used. With the other the best results were given by Roche 202 at 1,000 p.p.m. (4% strike compared with 1·25% in the control) and indoleacetic acid (IAA) plus naphthaleneacetic acid (NAA) each at 50 p.p.m. (6·66% compared with 1%). Some substances caused abnormal growth and distribution of roots and affected the geotropic angle, but Roche, NAA at 100 p.p.m., indolebutyric acid at 100 p.p.m. and IAA plus NAA resulted in the development of a symmetrical root system at the base of the cutting with 2–3 primary roots and abundant root hairs. Soft wood cuttings failed to root. In 1-year-old (but not 2-year-old) cuttings inversion of polarity (storage upside down for 3½ months) resulted in better striking (8%) than control (1%). Forcing 1- and 2-year-old cuttings at 25–28° C. and applying IAA at 100 p.p.m. to the base with or without the application of 50 p.p.m. to the apex gave the best results, namely 21% take.

1174. Anon.
Propagation by airwrapping.
Amer. Fruit Gr, 1953, **73** (12): 27, illus.

The "airwrap" method of propagation, developed by a firm in Florida, is a form of air-layering suitable for most woody plants, including apples and peaches. A plastic covering material used to enclose the rooting medium is treated with a water-soluble emulsion containing plant nutrients, root hormones, insecticides and fungicides.

1175. Devjatov, A. S.
The mentor effect of grafts on rootstocks of mature apple trees. [Russian.]
Agrobiologija, 1952, No. 5, pp. 75-9, illus.

Root cuttings from seedling rootstocks of the Anis apple variety, on which 4 different varieties were growing, developed into plants of differing vigour with differing morphological characters. The scion varieties also affected the resistance of the new plants to pests and their compatibility when further propagated. These variations observed in initially uniform material suggest that over a number of years the phasically mature scion varieties have a strong effect on the formation of characters of phasically young seedling rootstocks deprived of their photosynthetic organs. The mentor effect becomes evident only after about 4 years and increases with age.

1176. Sapožkov, I. A.
Changes in fruit trees due to grafting. [Russian.]
Agrobiologija, 1951, No. 6, pp. 125-8, illus.

Three examples are quoted showing the effects of old rootstocks on pears. The variety Tonkovetka, normally protogynous, when grafted on a 14-year-old red-fruited mountain ash (*Sorbus* sp.) became self-fertile. Some of the fruits of the wild Aldenskaja pear when worked on *Amelanchier* were large and of good quality. When the Bessenjanka variety was grafted on black-fruited mountain ash, changes occurred in both fruit and foliage.

1177. Mosse, B., and Garner, R. J.
Growth and structural changes induced in plum by an additional scion.
J. hort. Sci., 1954, **29**: 12-20, bibl. 11, illus.

Five-year-old trees of President and Victoria on the rootstock Myrobalan B were frameworked with Victoria and observed for a further 7 years. On 4 of the trees with President trunks, laterals of President were allowed to grow. Symptoms of incompatibility developed in the Victoria/President/Myrobalan B trees, and these were in no way lessened by the presence of President laterals. A histological examination was made of the union structure, the root structure, and the starch content of different parts of the trees. Trees with President trunks showed abnormalities in the following features: (1) a condition of "stem-pitting", due to a localized disintegration of the cambium, was found in the Myrobalan B rootstock stem below the union; (2) the structure of the phloem in the roots was highly abnormal. Measurement of the amount of uncollapsed phloem and its staining reaction with Trypan-Blue showed some correlation between the degrees of phloem abnormality and individual tree weight; (3) all trees with President trunks contained much starch in the shoots and little or none in the roots, while the starch content of trees with Victoria trunks was high in the roots and somewhat lower in the shoots. [Authors' summary.]—E. Malling Res. Stat., Kent.

1178. Hammond, D. H.
The dibber helps with rootstocks.
Comm. Gr, 1953, No. 3021, pp. 1003-4, illus.

On a commercial nursery it was found that planting fruit tree rootstocks with a dibber, instead of by the usual gripping-in method with a spade, resulted in well-rooted plants and a great saving in labour. Both one-year layers or one-year transplanted stocks could be planted in this way, although it was necessary to cut back the roots to within $\frac{1}{2}$–$\frac{3}{4}$ in. of the stem. It should be possible by this method to plant as many stocks per day as do machines with equal labour.

1179. Trenkle, R., and others.
Erster vorläufiger Bericht der Arbeitsgemeinschaft Obstbau der Staatlichen Lehr- und Forschungsanstalten und der Staatlichen Obstbaubetriebe in Bayern. **(First preliminary report of the fruit group of the Bavarian research stations and State fruit plantations.)**
Munich, 1953, pp. 91, illus.

The report consists of 4 articles:

Trenkle, R. Introduction, pp. 1-10, illus. The aims of the fruit group are defined and the problem of selecting hardy rootstocks and stem-builders for the fruit growing areas of Bavaria is stated in general terms.

Heese, —, and Pompejus, —. Results obtained in the testing of local sources of apple and pear seed, pp. 11-22, illus. In tests conducted for several years at Weihenstephan and Triesdorf a few old apple and pear trees in the area have already emerged as promising sources of seed for rootstocks. Plans for further work on the project are outlined.

Sörgel, P. First preliminary report of the Bavarian fruit group on stem-builder tests in the nursery stage, pp. 23-87, illus. Detailed data are presented on the nursery behaviour of 26 apple and 13 pear stem-builders worked on seedling rootstocks of high uniformity. The material was selected from old parent trees which had proved hardy and healthy in exposed locations and frost pockets.

Barg, T. Cytological studies of pome fruit varieties used as stem-builders and sources of seed, pp. 89-91. Of the 13 apple and 5 pear varieties tested at Weihenstephan 4 apple and 2 pear varieties were found to be triploids.

1180. Hutchinson, A.
Hardy rootstocks for prairie fruit trees.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 26-9.

The article reviews the rootstock situation in pome and stone fruits for the colder parts of Western Canada. The survey is confined to seedling rootstocks, as clonal rootstocks of the necessary hardiness are not yet available.

1181. (Lantz, H. L.)
Apples produce more on crab stocks.
Ia Fm Sci., 1953, **8** (5): 11.

In recent tests in Iowa, trees of Jonathan, Delicious, Grimes and Turley apples which were budded in 1947 on Hibernal and Virginia crab stocks [stem-builders] produced more fruit than the same varieties grown on their own trunks.

1182. Farmer, A.
Peach rootstocks. A comparison of Brompton plum and seedling peach.
Orchard. N.Z., 1953, **26** (9): 19-20, bibl. 4, illus.

Orchard tests suggest that Brompton plum is inferior to Golden Queen (the most widely used peach rootstock) as a rootstock for commercial peach trees in New Zealand.

1183. Abrahamse, S.
Het gebruik van tussenstammen bij peren. **(Intermediate stocks for pears.)**
Fruitteelt, 1953, **43**: 973.

A comparison is made of the average yields, since planting in 1937, of a number of pear varieties grafted on quince with various intermediate stocks. Triomphe de Vienne, Clapp's Favourite and Juttepeer gave markedly higher yields with Curé as intermediate than with Beurré Hardy. Curé appeared to be unsuitable for Kruidenier.

Winter hardiness.

(*See also* 1170, 1179, 1180, 2102.)

1184. Wilner, J.
The importance of maturity in cold resistance of certain woody plants grown under various climatic conditions on the prairies.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 70-81.

The paper gives the continuation of a study begun in 1951 [see *H.A.*, 23: 1521]. Numerous tabulated data record meteorological conditions in 1952 at several Western Canadian Horticultural Stations and show both the weight of the season's growth and the water content of mature twigs for the apple varieties Dolgo, Columbia, Heyer No. 12 and Wealthy. At all Stations the water content of Dolgo was the lowest and that of Wealthy the highest. This order seems to correspond with hardiness ratings, supporting the preliminary conclusion that greater wood maturity, i.e. lower water content, may be a factor in winter hardiness.

1185. Tarasenko, M. P.
Frost injury to apple stems in relation to rootstocks and scion. [Russian.]
Agrobiologija, 1952, No. 1, pp. 151-3.

In Kiev buds of the apple variety Papirovka, taken from the middle of shoots of both 2- and 38-year-old trees, budded on wild apple seedlings, produced more frost-resistant trees than buds taken from the lower or upper parts of the same shoots. The varieties Papirovka and Winter Gold Pearmain raised from central buds on wild seedlings and various vegetatively propagated dwarf rootstocks were observed during the winter of 1950/51. The stems of the less hardy variety, Winter Gold Pearmain, were not damaged but those of Papirovka on some clonal rootstocks were severely injured. The injury was due to incomplete wood maturity caused by drought during the early part of the preceding summer. The growth of Winter Gold Pearmain, which is a drought-resistant variety and has a long growing period, proceeded normally, but Papirovka on rootstocks with long growing periods showed renewed growth in late summer and its wood was not mature at the end of the season.

1186. Rjadnova, I. M.
The development of fruit buds during the autumn-winter period and their cold resistance. [Russian.]
Agrobiologija, 1951, No. 5, pp. 145-7.

Observations over 9 years in the Krasnodar province suggest that when November and December are mild the development of stone fruit or *Prunus* flower buds is usually complete by the middle of December. When November and December are cold the development of peach, apricot, sweet cherry, Japanese plum and cherry plum buds ends in January, that of European plum and sour cherry in early February. An early conclusion of fruit bud development reduces hardiness, resulting in serious losses if the latter part of the winter turns cold. It is thought that by applying certain cultural measures (summer pruning, irrigation, mulching) it should be possible to delay flower bud initiation in the summer, and development in the autumn and early winter, and thereby improve frost resistance of fruit buds.

1187. Ślaski, J., and Katulska, C.
Zdolność transpiracji niektórych odmian jabłoni w okresie spoczynku jako wskaznik ich odporności na przemarzanie. **(The rate of transpiration in some apple varieties during dormancy as an indication of their frost hardiness.)** [English and Russian summaries ¾ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (2): 99-106, bibl. 10.

One-year-old shoots of both hardy and frost-susceptible apple varieties taken and weighed on 10 December and kept at 3° to 6° C. were weighed again 12 and 36 days later. The loss of water from shoots of different varieties during the first 12-day period was not correlated with frost susceptibility, but during the subsequent 24-day period hardy varieties like Antonovka and Yellow Transparent lost less water than susceptible varieties such as Cox's Orange and Belle de Boskoop. The total water content of the shoots depended largely on the soil conditions under which the trees were grown, but there was a small and persistent difference in the water content of the different varieties. Shoots collected from different sides of the tree showed no difference in rate of transpiration.

1188. Pieniążek, S. A., and Rejman, A.
Wpływ wysokości pnia na przemarzanie drzew owocowych. **(The effect of trunk height on the hardiness of fruit trees.)** [English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (3): 99-105, bibl. 5, illus.

In an orchard containing a collection of apple and plum varieties planted between 1928 and 1932 rows of standard trees alternated with rows of half-standards and bushes. The standards, irrespective of source of origin or rootstocks, were more susceptible to frost damage than the half-standards or bushes. During the severe winter of 1939/40 and the following 10 winters 40% of the standard apple and plum trees were killed by frost as compared with 19% of half-standards and bushes. The most marked effect of trunk height on winter killing was observed in plums where in certain blocks losses in standards amounted to 80% as against 20% in half-standards and bushes. On the basis of these

observations conducted on 852 trees the authors recommend that new orchards in Poland should be planted exclusively with short-stemmed fruit trees.

1189. Černjaev, I. P.
Increasing the frost resistance of fruit trees by crown grafting. [Russian.]
Agrobiologija, 1951, No. 5, pp. 151-5.
Many examples are quoted showing how hardiness was increased by top-working. Apple and pear varieties suitable as frame builders in the southern parts of U.S.S.R. are suggested. Other recommendations include top-working southern varieties of apricot on northern varieties, sweet cherries on sour cherries, walnuts [*Juglans regia*] on black walnut [*J. nigra*] or better still on the Ussurian species, and valuable southern hazel nuts on hardy local varieties.

Growth phenomena.

(*See also* 1090, 1091, 1236q, r.)

1190. Philpott, J.
A blade tissue study of leaves of forty-seven species of *Ficus*.
Bot. Gaz., 1953, **115**: 15-35, bibl. 20, illus.
The object of the study was to identify the fundamental patterns of tissue arrangement and tissue proportions. Half the specimens were collected in Florida and half came from a tropical greenhouse in the Missouri Botanical Garden.—Dep. Bot., Duke Univ., Durham, N.C.

1191. Ulrich, R.
Maturation naturelle et artificielle des fruits. **(Natural and artificial ripening of fruit.)**
Fruits d'Outre Mer, 1953, **8**: 427-36, illus.
After a summary of the normal physiological processes of ripening, this review [with incomplete references in text] gives notes on factors capable of retarding and hastening maturation. Inhibiting factors are cold, low oxygen, high carbon dioxide, coating with wax, and chemical-impregnated paper wrapping. Hastening factors are warmth, high oxygen, volatile organic substances, ethylene, acetylene and hetero-auxins. The phenomena of incomplete, abnormal and abnormally rapid maturation are also discussed.

Pollination.

1192. Šaĭtan, I. M.
Interaction between components of pollen mixtures. [Russian.]
Agrobiologija, 1952, No. 5, pp. 108-11, illus.
Data are presented showing that some mixtures of fruit pollen germinated better than the individual pollen components while others germinated worse. Pollen mixtures giving the highest percentages of germination were: apricot+cherry+almond with 72·5%, apricot+almond with 69·8% and apricot+cherry with 67·3%. Those showing the lowest rates were: peach+apricot with 14·4%, pear+apple with 14·7% and peach+almond with 17·7%.

1193. Zavackaja, E. A.
Selective fertilization of the apple Pepin Šafrannyĭ. [Russian.]
Agrobiologija, 1952, No. 2, pp. 122-4.
At Mičurinsk, Pepin Šafrannyĭ set better when open-pollinated or pollinated with mixed pollen of the same variety obtained from 3 different sources than when pollinated with single pollen samples from the same 3 sources. The largest quantity of seed per fruit was, however, obtained through the use of pollen from one source, the Crimea.

1194. Abramov, N. A.
The effect of pollination on the date of germination of apple seeds. [Russian.]
Agrobiologija, 1952, No. 5, pp. 111-15, bibl. 12.
Experiments at Mičurinsk have shown that the number of days required for the germination of apple seeds is affected by the pollinator. Thus stratified seed of Antonovka when pollinated by a Siberian apple germinated on an average in 72 days and when pollinated by Anis in 103 days.

1195. Baranova, A. P.
The effects of self-pollination and cross-pollination on the growth and development of plum and cherry seedlings. [Russian.]
Agrobiologija, 1951, No. 5, pp. 111-22, bibl. 11, illus.
Data are presented showing that plum and cherry seedlings raised from cross-pollinated seed were more vigorous than those raised from self-pollinated seed. The improvement in the growth and development of the hybrids depended on the pollinating material; seedlings from cross-pollination between trees growing under different environmental conditions showed greater vigour than those produced by cross-pollinating the same varieties growing under similar conditions. Seedlings obtained by pollination with mixed pollen were taller and healthier than hybrids from crosses involving only 2 varieties.

1196. Bulanda, M.
Badania stosunków wzajemnego zapylania się czereśni, wiśni i czerech. **(Studies on the pollination of sweet, sour and Duke cherries.)**
[English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (4): 95-114, bibl. 40.
World literature on cherry pollination is briefly reviewed and results of investigations on 20 varieties grown in Poland are tabulated. A list of suitable pollinators is given for the self-sterile varieties.

1197. Haskell, G.
Stamen number and variation in diploid and tetraploid cherries.
Ann. Bot. Lond., 1954, **18**: 95-111, bibl. 19.
Stamen numbers were counted on flowers from a collection of cherries, sweet cultivated varieties of *Prunus avium* and *P. cerasus*. The most frequent numbers were 34 and 39–40, no doubt representing seven and eight times the petal number. The character is apparently genetically controlled, clones being highly uniform within themselves but differing from others. On the average, flowers of tetraploid Morellos (*P. cerasus*) had lower numbers than diploid sweet cherries (*P. avium*), while tetraploid Dukes were intermediate; this accords with the suspected hybrid origin of the

Dukes. Stamen number and variation was not associated with economic characters, but there was a tendency for varieties in more frequent incompatibility groups I–VI to have lower values than groups VII–XII. [Author's abstract.]—John Innes hort. Instn.

Spraying for cultural purposes.

(*See also* 1299, 1813k.)

1198. Gertych, Z.
Opóźnianie kwitnienia drzew owocowych przy pomocy syntetycznych substancji wzrostowych. (**Delaying blossoming in fruit trees by means of growth substances.**) [English and Russian summaries ¾ and 1¼ pp. respectively.]
Roczn. Nauk rol., Ser. A, 1953, **66** (4): 115-28, bibl. 8.

The sodium salt of naphthaleneacetic acid at concentrations of 100 to 600 mg. per litre sprayed on cherry, apricot and peach varieties either in late summer or in the spring during bud swelling delayed flowering by only 1 to 5 days. A similar insufficient delay was obtained when 2,4-D at 10 to 400 mg. per litre was applied to the soil around the plum variety Ruth Gerstädter.

1199. Bömeke, H.
Die Anwendung der Hormonpräparate im Obstbau. (**The application of hormone preparations to fruit trees.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1954, **6**: 5-6.

Apple and pear varieties are listed which in German experiments responded well to hormone treatment for the control of pre-harvest fruit drop. The timing of the applications is discussed.

1200. Falch, J.
Vorläufige Versuchsergebnisse mit dem Wirkstoff BC 245. (**Preliminary results obtained with the growth substance preparation BC 245.**) [Short English, French and Spanish summaries.]
Mitt. Klosterneuburg, Ser. B, 1954, **4**: 23-34.

Applications on 1 August, 1953, of BC 245 [a trichlorophenoxyacetic acid preparation?] at 0·07% enhanced fruit colouring and hastened fruit ripening in several apple and pear varieties. The storage quality of treated fruits was adversely affected and their acid, though not their sugar, content was reduced. The treatment reduced premature fruit drop.

1201. Kunokami, T., and Ashizawa, M.
Effects of 2,4-D sprays in delaying the defoliation of deciduous fruit trees. I. [Japanese, with English summary ½ p.]
Tech. Bull. Kagawa. agric. Coll., 1952, **4**: 124-31, bibl. 12.

The application at the end of the season of 2,4-D sprays (20 p.p.m.) to the leaves of fruit trees delayed natural defoliation by about 8 days in persimmon and by about 15 days in fig and sand pear [*Pyrus pyrifolia?*], while apples failed to respond. The treatment was equally effective on leaves that had and those that had not begun to form an abscission layer.

Soil management.

(*See also* 1129.)

1202. Karnatz, H.
Bodenbedeckungsversuch mit Torfstreu bei verschulten Kernobstsämlingen. (**A soil covering trial with granulated peat on pome fruit seedlings in the nursery.**)
Mitt. ObstbVersuchsrings Jork, 1953, **8**: 284-5.

Apple and pear seedlings were mulched with granulated peat after planting out in the nursery in March 1953. There was sufficient rainfall for the soil, a sandy loam in good tilth, to remain moist in the control plots throughout the growing season. By the middle of October when autumn colouring set in, the treated plants were conspicuous by the dark-green colour of the foliage. On lifting a month later the treated apples were noticed to have formed many adventitious roots and to have developed better root systems. The treatment increased the proportion of pears with stem diameters over 8 mm. by 9·3% and of 2 apple rootstocks by 4·0 and 5·2% respectively.

1203. Hilton, R. J.
Cultural procedure for prairie orchards.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 29-31, bibl. 4.

From a comparison of various cultural and irrigation studies on tree fruits under dry conditions, the conclusion is reached that an ideal procedure would be to use a frost-tender cover crop in late summer and early fall, together with a thorough application of irrigation water just before freeze-up if rainfall has been light. [From author's summary.]

1204. Spivakovskiĭ, N. D.
The reaction of different varieties of apples to temporary sward. [Russian.]
Sad i Ogorod, 1953, No. 11, pp. 59-62.

Data are presented on the behaviour of 4 apple varieties grown under clean cultivation plus summer cover crops and under 2 types of temporary sward, all 3 plots receiving comparable fertilizer applications. In the latter permanent grasses sown in the summer between each row or along every second inter-row of trees were ploughed under at the end of the following season. The effects of the swards varied with both type of sward and variety of apple, but compared unfavourably with that of clean cultivation. A greater reduction of both growth and yield occurred in plots under complete sward than on plots under half sward, the adverse effect being greater on 2 late varieties than on a medium and an early variety. When the sward was ploughed under the condition of the trees improved during the next 2 years.

1205. Zaliwski, S.
Wpływ różnych systemów trawnika na rozwój i owocowanie wiśni. (**The influence of different systems of sod management on the yield and development of sour cherries.**) [English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (2): 131-40, bibl. 10.

The yield responses and growth of sour cherry trees, variety Hiszpanka [Spanish Glasscherry] on Mahaleb

rootstocks, grown under sod receiving 3 different treatments, were observed over 5 years. The trees planted in 1947 at Górna Niwa near Lublin began to bear in 1950. The highest yield and best developed trees were obtained where the grass was cut 3 times a year and left as mulch. Plots which were never mowed produced much lower yields, and those where the grass was cut but removed produced the least satisfactory yields and trees.

1206. (Havis, A. L., and others.)
Practices that help peaches.
Agric. Res., 1954, **2** (7): 8.

A brief note is given on soil-management experiments at Beltsville, Maryland, from which it is concluded that, under conditions of adequate soil moisture, tree growth, fruit yield and fruit colour in peaches were largely controlled by the interrelationship of 3 factors, namely time of applying nitrogen, time of discing in a rye cover crop and variety.

Nutrition.

(*See also* 1236d, 2119g.)

1207. Bollard, E. G.
The use of tracheal sap in the study of apple-tree nutrition.
J. exp. Bot., 1953, **4**: 363-8, bibl. 15.

A method of extraction of tracheal sap from shoots of apple trees in quantity sufficient for analysis is described. Total solids, conductivity, nitrogen, phosphate, potassium and magnesium levels were determined in saps from trees of a single variety on different stocks through one season. A marked seasonal fluctuation in levels of each of the four elements was noted. [Author's summary.]—Fruit Res. Stat., Auckland, N.Z.

1208. Sato, K., and others.
Studies on leaf analysis of fruit trees.
[Japanese, with English summaries.]
Bull. nat. Inst. agric. Sci. Hiratsuka Ser. E, **1**, 1952, pp. 76, bibls., illus.

(1) *Fundamental studies of leaf analysis* by K. Sato, M. Ishihara and S. Wakabayashi, pp. 3-28, bibl. 48. Leaf analyses of Satsuma orange, pear, persimmon and peach for N, P, K, Ca and Mg were carried out for 4 seasons (1948–51). In all these species the N, P, K content of the young foliage was high, decreasing later. Vigorous orange, pear and persimmon trees showed a higher K and N content than weakly growing varieties. The most suitable time for taking 2–3 leaf samples was found to be the period July–September in orange and June–August in the other fruits. A detailed study was carried out on the effect upon leaf composition of various factors, such as position of leaf, spray damage, girdling and variety. With all the species examined the effect of fruiting on leaf K content was marked. Defruiting reduced the seasonal decline in K content, the difference between treated trees and the controls being 10–20%. A negative relationship existed between Ca and Mg content on the one hand and K, N and P leaf content on the other. (2) *Leaf analysis in Satsuma orange orchards* by K. Sato, M. Ishihara and R. Harada, pp. 29-42, bibl. 9. Leaf analyses were carried out for 3 years (1949–51) in over 100 citrus groves of two districts. The lowest NPK contents in 29 thriving orchards were 2·9%, 0·15% and 1·17% of leaf dry weight respectively. These values are considered to be near the optimum level for fruit production. The analytical data are fully tabulated. No correlation existed between fertilizer applications and leaf composition. (3) *Leaf analysis in Japanese pear orchards* by K. Sato, M. Ishihara and R. Harada, pp. 43-59, bibl. 18. Leaf analyses of the Chōjuro and Nijjiseiki varieties of Japanese pear were carried out for 2 years (1950–51) in nearly 200 pear orchards of two districts. The lowest NPK contents in 45 thriving orchards were 2·44%, 0·12% and 1·18% of the leaf dry weight respectively. These values are considered to be near the optimum for fruit production. The analytical results are fully tabulated. There was no clear correlation between leaf composition and the amount of fertilizer applied. (4) *Studies on mineral deficiencies in Japanese pear and Satsuma orange* by K. Sato, M. Ishihara and R. Harada, pp. 60-72, bibl. 22. Japanese pear and Satsuma orange seedlings were raised in sand culture for 3 years (1948–50), the symptoms shown in the case of N, P, K, Ca and Mg deficiencies being described and illustrated. The nutrient content of leaves showing symptoms of one of these deficiencies was determined as N 0·83%, P 0·07%, K 0·27–0·41%, Ca 0·66%, Mg 0·09–0·11% for pear and N 1·58%, P 0·07–0·08%, K 0·30–0·47%, Ca 0·93%, Mg 0·10% for orange. The tables presented in the 4 papers have English captions.

1209. Wehunt, R. L., and Purvis, E. R.
Some relationships between leaf and soil potassium in New Jersey apple orchards.
Bett. Crops, 1953, **37** (8): 19-22, 40, bibl. 2, illus.

Wide variations in fertility levels were found in a survey of 78 apple orchards. Soil from beneath limb-spread of trees contained more available K and less available Ca and Mg, and had a lower pH value than that from the row middles. Soil and leaf potassium were significantly related to each other. Leaves of trees growing on soils with high levels of Ca, Mg and P were low in K. When the depressing action of these 3 elements was taken into account, a much higher degree of correlation was found between soil and leaf potassium ($R=0·69$). Orchard soils with high levels of available K produced leaves of lower Mg and N and higher P content than those with low K levels. Leaves with high levels of N contained less K and more Mg than those with low amounts of this element. [From authors' summary.]

1210. Eaves, C. A., and Kelsall, A.
Chemical composition of Cortland apple leaves in relation to nutritional treatment.
J. hort. Sci., 1954, **29**: 59-71, bibl. 15.

Applications of nitrogen, phosphorus, potassium and magnesium (in dolomitic limestone) were reflected in the chemical composition of Cortland apple leaves. Severe magnesium deficiencies developed in the unlimed blocks in the year with higher rainfall and were associated with a critical level of 0·175% leaf magnesium. Incipient potassium deficiency symptoms appeared in trees receiving lime and nitrogen only, the leaves of which contained 1·0% of potassium or less. Seasonal conditions during 1950 and 1951 profoundly affected the mineral content of leaves in that there was an

increase of approximately 20% of phosphorus and potassium and a decrease of 34·8% magnesium in the year with the higher rainfall. Ion antagonism appeared to exist within the pairs of ions, N–P and K–Mg, and possibly also N–Ca, but neither N–K nor N–Mg showed any direct correlations. It is suggested, therefore, that magnesium deficiency in apple trees is due to relatively high levels of potassium or phosphorus and may be mitigated by nitrogen applications, which serve to dilute the concentration of potassium ions or hamper the intake of phosphorus ions. [From authors' summary.]—Domin. exp. Fm, Kentville, N.S.

Composition of plants and fruit.

(*See also* 1087, 1236g, i.)

1211. Thiem, H.
Ein Beitrag zur Qualitätserzeugung von Obst. Über die Anwendung des Zeiss'schen Handrefraktometers im Obstbau. **(On the application of the Zeiss hand refractometer in the production of quality fruit.)**
Badisch. Obst.-u. Gartenb., 1953, **6**: 153-5, 174-7.

In viticulture the determination of the sugar content of the grape juice is a matter of routine for every vintage. The author pleads for a more general extension of this practice to the assessment of top and small fruit quality. Sugar values, obtained with the Zeiss hand refractometer, are tabulated for the juice of many varieties of cherry, plum, peach, pear, apple, strawberry, raspberry, blackberry, gooseberry, currant and blueberry, and also for *Lonicera tatarica*, a host of the cherry fruit fly.

1212. McKee, H. S., and Urbach, G. E.
The physiology of growth in apple fruits. V. Soluble nitrogen constituents.
Aust. J. biol. Sci., 1953, **6**: 369-78, bibl. 24.

The ninhydrin-reacting compounds of the apple fruit have been studied during its development on the tree. The compounds present show little variation but glutamine, conspicuous in very young and over-mature apples, disappears at intermediate stages. The increase in soluble nitrogenous compounds occurring in over-mature apples left on the tree is confirmed qualitatively. An account is given of the chromatographic behaviour of several unidentified ninhydrin-reacting substances found in extracts of apple fruits, leaves and stems. [Authors' summary.]

1213. Catel, W., and Schuphan, W.
Über den verschiedenen Gehalt einzelner Apfelsorten an Vitamin C und seine Bedeutung für die Ernährung (Untersuchungen an tuberkulosekranken Kindern). **(On the difference in vitamin C content in several apple varieties and its significance in nutrition (studies on tubercular children).)**
Reprinted from *Mschr. Kinderheilk.*, 1953, **101**: 473-7, bibl. 11.

Children eating daily 500 g. apple of a variety rich in vitamin C (Ontario) maintained a blood vitamin C content of at least 0·6 mg./%, which shows that this source of vitamin C proved adequate for a growing organism. The vitamin C content of the variety Geheimrat Oldenburg, on the other hand, was found to be too low to be a satisfactory source. [See also *H.A.*, 23: 3863.]

1214. Kott, V.
Dynamika obsaku l-askorbové kyseliny v ovoci za vegetace. **(The dynamics of the *l*-ascorbic acid content of fruits during development.)** [English and Russian summaries ½ p. each.]
Sborn. čsl. Akad. zeměd. Věd, Ser. A, 1953, **26**: 427-46, bibl. 24, illus.

In the 1951 and 1952 growing seasons varieties of apple, pear and sweet and sour cherries were examined at regular intervals. The *l*-ascorbic acid content in all species and varieties was highest during the early stages of development when the seeds or stones were still soft and undeveloped. After this period the *l*-ascorbic acid content dropped sharply. A second, though smaller, rise was observed during ripening, reaching its maximum at physiological maturity. In overripe fruit the *l*-ascorbic acid content dropped again. A large difference between the *l*-ascorbic acid content of peel and flesh was noted in apples as from the beginning of development, but in pears it became apparent only towards the end of ripening.

1215. Anet, E. F. L. J., and Reynolds, T. M.
Isolation of *l*-quinic acid from the peach fruit.
Nature, 1953, **172**: 1188-9, bibl. 10, illus.

A method of isolating *l*-quinic acid from peach fruits is described. All the samples of eating-ripe peaches from several varieties and locations were found to contain a considerable proportion of quinic acid.—Div. Food Pres. Transp., C.S.I.R.O., Homebush, N.S.W.

1216. Tarr, H. L. A., and Cooke, N. E.
Comparative value of carbonyl enediols in retarding enzymic browning of fruits.
Food Tech., 1950, **6**: 245-7, bibl. 9, being *Pap. Canad. Cttee Food Pres.* **253**.

The authors found that cyclic and acyclic carbonyl enediols including *l*-ascorbic acid, reductic acid, reductone and dihydroxymaleic acid retarded enzymic browning of defrosted peaches, apples, pears and apricots. Sodium and ammonium dihydroxymaleate were ineffective. [Authors' summary.]

Storage.

(*See also* 1236m.)

1217. Anon.
Keeping quality of apples.
Rur. Res. C.S.I.R.O., 1953, No. 6, pp. 27-9, bibl. 4.

Investigations in Australia have shown that the relatively poor keeping quality of apples from light, off-year crops is associated with larger size of individual cells. Cell division ceases in the fruit about 4 weeks after pollination and thereafter cells continue to enlarge throughout the life of the fruit on the tree. The number of cells is fairly constant for each variety of apple. Experiments are now in progress to determine the effects of pruning, manuring, etc., on cell division and cell size. In general, practices that stimulate cell division in the period after pollination or prolong the period of cell division should improve keeping quality, whereas practices promoting increases in cell size might be expected to shorten storage life.

1218. Martin, D.
Variation between apple fruits and its relation to keeping quality. I. Within-tree variation.
Aust. J. agric. Res., 1953, **4**: 235-48, bibl. 14.

Variations within trees of diameter, colour, firmness, starch conversion, total acid, and soluble solids of fruit were examined for branches of different aspect for 4 varieties of apple and at different stages of maturity for one of these. Incidence of the storage disorders pit and breakdown in Cox's Orange Pippin, Jonathan spot and deep scald in Jonathan, and pit in Cleopatra and Sturmer was examined in quarter-inch fruit size groups within trees. *Fruit measurements:* A general interrelationship was found between the variables and in particular a very strong bond between acid and starch conversion. An interesting feature, however, was the difference in pattern between Cox, Jonathan and Sturmer on the one hand and Cleopatra on the other. In the former the changes of acid loss, starch conversion and perhaps softening proceeded faster and soluble solids accumulated more slowly in the larger fruit, whereas in Cleopatra larger fruit was characterized by higher acid and lower starch loss. Differences in the characteristics of fruit from different branches became significant even when differences due to variation in fruit size between branches were eliminated; these differences can probably be regarded as responses to different cropping levels and not to differences in aspect. *Fruit size:* Percentage disorder was positively correlated with diameter of fruit, but although the relationship appeared to be linear over the restricted size range there was no justification for extrapolating it. The direct correlation of size with percentage breakdown, deep scald or Jonathan spot might be due, at least in part, to the direct relation of size and maturity factors shown for Cox and Jonathan, but this could not explain a direct relationship between size and pit in Cox and Sturmer, because pit incidence decreases with maturity. *Aspect:* It would appear that variation in the incidence of storage disorders with branch or aspect followed a pattern similar to the differences shown for the other variables. In some cases there were significant differences in fruit disorders between different branches. It is suggested that these differences may be correlated with mean fruit size.—C.S.I.R.O., Hobart, Tas.

1219. Kessler, H., and Stoll, K.
Versuchsergebnisse bei der Kaltlagerung von Apfelsorten. **(Results of cold storage trials with apple varieties.)** [French summary ½ p.]
Landw. Jb. Schweiz, 1953, **67**: 1157-84, bibl. 32.

The paper summarizes many years' data from apple storage trials which were recorded by Kessler and after his death arranged and supplemented (for 1951/52 and 1952/53) by the junior author. Descriptions are given of the behaviour of over 30 apple varieties, some of them well known outside Switzerland, in cold and in cellar storage, with detailed data on losses from several causes, optimum temperature, and period of eating maturity. General recommendations are made on the treatment of apples in store.—Wädenswil.

1220. Castberg, C.
Rapport från fruktlagringsnämnden. **(Report of the [Swedish] fruit storage committee.)**
Fruktodlaren, 1954, No. 1, pp. 19-21.

The storage quality of several apple varieties at 2·5–4·5° C. was again assessed in 1952–53 in tests conducted by the Swedish Pomological Society. Ribston was the best keeper, with Laxton's Superb following closely. Ribston and Cox's Pomona had the highest vitamin C content (16 mg./100 g.) followed by Cox's Orange (8 mg./100 g.). Loss of vitamin C from January to the end of March averaged 10%. The commercial value of the stored lots and losses from various causes are briefly discussed.

1221. Jamalainen, E. A.
Suomessa viljeltyjen omenalajikkeiden säilyvydestä varastossa. **(The storage qualities of Finnish apple varieties.)** [English summary 1 p.]
Maataloust. Aikakausk., 1953, **25**: 136-46, bibl. 6, illus.

The results of preliminary apple storage trials, carried out with the more important Finnish varieties during the winter of 1952/53, are tabulated with English subtitles. Losses from *Gloeosporium album* were heavy, especially in the store with the highest humidity (93–98%). The variety Wealthy was more seriously affected by this rot than the Russian, Swedish and Finnish varieties tested.—Dep. Plant Path., Tikkurila.

1222. Fisher, D. V., Palmer, R. C., and Porritt, S. W.
Pear harvesting and storage in British Columbia.
Publ. exp. Fms Serv. Dep. Agric., Ottawa **895,** 1953, pp. 22, bibl. 18, illus.

Pressure ranges based on the use of the Ballauf pressure tester and approximate harvest dates are suggested for 12 pear varieties grown in the Okanagan Valley, and safe storage periods at 30–32° F. are suggested for 6 varieties. The use of carbon dioxide for both long term storage and long distance transport, ripening requirements, and storage disorders with appropriate control measures are discussed.

1223. Hall, E. G., and Sykes, M. T.
The cool storage of pears.
[*Publ.*] *N.S.W. Dep. Agric., Div. Hort.*, 1953, pp. 7, bibl. 5, illus.

Successful storage of pears depends on picking the fruit as soon as it is fully developed and while it is still hard and green, placing in store without delay, cooling down quickly, maintaining at a uniform temperature of 29–30° F. during the cold storage period, and removing at or before the first sign of over-storage. The picking dates for New South Wales and southern Victoria and the storage life of Williams', Bosc, Packham, Josephine, Winter Cole and Winter Nelis are given.

1224. Bester, J. J. A.
Results of gas storage experiments conducted with Bon Chretien pears.
Decid. Fruit Gr, 1953, **3** (12): 10-13, bibl. 4.

Bon Chretien [Williams'], one of the most important pear varieties in South Africa, has a storage life of only

4–6 weeks in air at 31° F. (−0·55° C.). Tests showed, however, that it keeps well at this temperature in gas storage in mixtures of either 10: 10: 80 or 5: 15: 80 carbon dioxide/oxygen/nitrogen. "Even after 5 months gas stored pears ripened comparatively normally while air stored pears lost their ability to mature where storage had lasted for longer than 2 months. The pressure of gas stored pears diminished more slowly than that of pears stored in air. The occurrence of internal breakdown and superficial burns was less noticeable in gas stored pears than in air stored pears. Where it did occur in gas stored pears, the damage was superficial and the quality of the fruit not materially affected."—W. Prov. Fruit Res. Stat.

1225. Hall, E. G., Sykes, S. M., and Trout, S. A.
Effects of skin coatings on the behaviour of apples in storage. II.* Common storage investigations.
Aust. J. agric. Res., 1953, **4**: 264-82, bibl. 5, illus.

Apples of several varieties, particularly Granny Smith, were held in unrefrigerated storage after treatment with skin coatings. Under favourable conditions their storage life was increased by about 50%, the greatest increase being with early varieties. Undesirable side effects are discussed. Temperatures above 70° F. were found to be detrimental and fruit held best after coating when picked at the optimum stage of maturity. A number of coatings are described, the best being an 8–10% alcoholic solution of 2 parts of castor oil and 1 part of wax-free shellac (C.O.S.). Waxes, however, reduced shrivelling much more than the other coatings. All coatings controlled Jonathan spot and greatly reduced bitter pit. Only the alcoholic solutions reduced mould, which was often increased by emulsions. [From authors' summary.]

1226. Hall, E. G., Sykes, S. M., and Trout, S. A.
Effects of skin coatings on the behaviour of apples in storage. III.* Cool storage investigations.
Aust. J. agric. Res., 1953, **4**: 365-83, bibl. 14, illus.

The effects of skin coatings on several varieties of apple were studied in several seasons from 1941 to 1946. As in the trials in common storage, castor oil and shellac (C.O.S.) proved the most successful coating, a 7–10% solution increasing the commercial cold-storage life by 25–30%. C.O.S. and some oil coatings controlled superficial scald, but to a less degree than good oiled wraps. Again, exposure to temperatures of over 70° F. either before or after storage was detrimental to the fruit. At times, some direct injury to the fruit was caused by the coatings, but under favourable conditions was usually not of commercial significance. Wrapping in plain or oiled wraps improved the appearance of the fruit. At present, however, it is not possible to recommend confidently the use of any skin coating as a reliable commercial procedure.

1227. (Gerhardt, F., and Schomer, H. A.)
Plastic liner helps store fruit longer.
Agric. Res., 1953, **2** (6): 7.

Pears sealed in plastic film kept in storage at 31° F. for a month or two longer than when packed without film. Golden Delicious apples in plastic-lined boxes maintained better appearance and eating quality than standard packs after 6 months cold storage. Plastic-lined boxes are, however, recommended only for sound fruit intended for long storage which has been washed in a fungicide.

1228. Nicolaisen, N., and Nicolaisen-Scupin, L.
Lagerungsschäden an Obst, insbesondere bei Kaltlagerung. **(Storage disorders of fruit, with special reference to cold storage injuries.)**
Fachverband der Kühlhäuser e.V., Hamburg 1, Wandalenweg 35, 1952, pp. 47, 17 coloured plates, DM. 6.–, from review in *Schweiz. Z. Obst-u. Weinb.*, 1954, **63**: 493.

The authors set themselves the task of surveying the results of experimental work carried out during the last two decades on storage disorders of German fruit. It contains 88 coloured illustrations on 17 plates.

1229. Kuć, J., Henze, R. E., and Quackenbush, F. W.
Apple scald, production and control in the laboratory.
J. agric. Food Chem., 1953, **1**: 1104-7, bibl. 16.

This investigation was undertaken to determine the nature of the volatiles responsible for storage scald of apples. Crude ether extracts of activated carbon were used for a storage season in a commercial apple store and were shown to produce scald-like injury. This injury was initially indistinguishable from apple scald as it occurs in commercial refrigerated storage. Scald tests using fractions of the crude ether-free extract showed that esters were most active in producing scald-like injury, and alcohols and acids much less so. An apparatus was devised for testing various chemical solutions as agents to remove injury-producing volatiles from the air. Of the solutions tested, aqueous alkaline permanganate was the most effective. [From authors' summary.]

1230. Kuć, J., and others.
Apple scald; use of alkaline permanganate for control in refrigerated store.
J. agric. Food Chem., 1953, **1**: 1107-9, bibl. 2.

Preliminary studies on the use of alkaline permanganate air scrubbing for control of apple scald in refrigerated storage rooms showed considerable promise. An experimental air-scrubbing apparatus is described and the approximate cost of operation is given. [Authors' summary.]

Packing, marketing and processing.

(*See also* 1236a, b.)

1231. Hall, E. G.
Overseas practices in packaging fresh fruit.
Food Pres. Quart., 1953, **13**: 51-60, bibl. 5, illus.

Various packages used in the United States and Europe are discussed with special reference to apples, citrus fruits and tomatoes, and reference is made to the use of diphenyl as a fungicide in "volume fill" citrus cartons in which the fruit is unwrapped. Recent developments in Australia are outlined.

* For abstract of Part I, see *H.A.*, 23: 2663.

1232. DOMINICK, B. A., Jr.
Merchandising McIntosh apples in retail stores.
Bull. Cornell agric. Exp. Stat. **895,** 1953, pp. 22, illus.

The study described here is concerned entirely with the responses of customers to apples displayed in various ways in retail stores, but some points may be of indirect interest to packers of apples. The results showed, for example, that the inclusion of some apples packed in 6-lb. polythene bags in bulk displays resulted in doubling sales when compared with bulk displays alone. 6-lb. polythene bags resulted in larger sales than 4-lb. bags and in much larger sales than 2-lb. bags. Polythene bags were slightly more attractive than cellophane bags. Increasing the degree of red colour of the apples displayed from 50% to 75% increased sales by 69%. Offering apples relatively free from bruises only increased sales by 19%, which did not approach significance at the 5% level. The statistical design of the investigation, based on Latin squares, is described in an appendix.

1233. SMITH, C. N.
Outlets utilized by Cumberland-Shenandoah growers in marketing the 1950-51 apple crop. Some recent trends in the Appalachian apple industry.
Bulls Va agric. Exp. Stat. **461** and **462,** 1953, pp. 68 and 61, being *N.E. Reg. Publs* **12** and **15.**

Apple consumption is declining in the face of intense competition from citrus fruits and bananas. These 2 bulletins are designed to help growers to make the necessary adjustments to face this competition. They cover crop utilization (fresh, processing, canning), varietal utilization and production trends, containers, markets for packed and bulk fruit, competition with other commodities and producing areas, and retail selling prices.

1234. NEUBERT, A. M., AND OTHERS.
Juice quality of Delicious apples as affected by methods of fruit handling.
Food Tech., 1953, **7**: 324-9, from abstr. in *Food Sci. Abstr.*, 1954, **26,** No. 311.

The flavour of juice from Delicious apples improved with increase in maturity at harvest; however, juices of good flavour were produced from greener fruit by adequate post-harvest ripening, which was accompanied by a marked increase in content of sugars and loss of starch. Holding apples in cold storage for periods of up to 4 months slightly altered the flavour of the juice, but it remained equally acceptable. Storage scald, when confined to the skin, did not affect the quality of the juice. Allowing apples to ripen for 1 to 2 weeks after removal from cold store tended to eliminate foreign odours and flavours absorbed during storage, and to encourage the development of flavour and sweetness. Pressure tests and determinations of starch content were found to be suitable indexes of optimum ripeness for pressing.

1235. BOUSSER, R.
Le séchage des fruits au Maroc. (**Fruit drying in Morocco.**)
Terre maroc., 1953, **27**: 337-44, and *Fruits d'Outre Mer*, 1953, **8**: 440-4.

General recommendations to growers are followed by instructions for the air-drying of apricots, figs and raisins (dipping in citric acid and salt followed by treatment with sulphur dioxide), and on the preparation of apricot paste without artificial heating.

Noted.

1236.

a ATKINSON, F. E., AND OTHERS.
Improvements in the candying of fruits.
Food Tech., 1952, **6**: 431-6, bibl. 6, being *Pap. Canad. Cttee Food Pres.* **283.**
Syrup evaporators, dyes and appropriate sugars.

b BOWEN, J. F., STRACHAN, C. C., AND DAVIS, C. W.
Effect of preservatives on fermentation spoilage in pickled cherries.
Food Tech., 1953, **7**: 102-5, bibl. 13, being *Pap. Canad. Cttee Food Pres.* **280.**

c CERRINI, U.
La peschicoltura in Umbria. (**Peach growing in Umbria.**)
Ital. agric., 1953, **90**: 804-10, bibl. 10, illus.

d DERMOTT, W.
The manuring of fruit. 1. Young trees. 2. Mature trees.
Agriculture, Lond., 1954, **60**: 463-5 and 521-4.
Tree fruits in S.E. England.

e EVREINOFF, V.-A.
Notes sur l'origine, la biologie et les variétés du néflier. (**Notes on origin, biology and varieties of the medlar.**)
Rev. hort. Paris, 1953, **125**: 976-9, bibl. 14.

f FRIEDRICH, G.
Untersuchungen über die Trieb- und Ertragsleistungen einiger Apfelsorten auf verschiedenen Malusunterlagen in Mitteldeutschland. (**Rate of growth and yield of several apple varieties on different *Malus* rootstocks in central Germany.**)
Arch. Gartenb., 1953, **1**: 344-78, bibl. 28, illus.
See *H.A.*, 23: 2557.

g JAMES, D. P.
Nicotinic acid, pantothenic acid, and biotin in fruits, vegetables and nuts.
Brit. J. Nutrit., 1952, **6**: 341-56, from abstr. in *Brit. Abstr.* **A.III,** 1953, column 858.

h JEFFERS, R. H.
Ringing fruit trees in the eighteenth century.
Gdnrs' Chron., 1954, **135**: 14-15.
To check growth and promote fruiting.

i KIESER, M. E., POLLARD, A., AND WILLIAMS, A. H.
The occurrence of leuco-anthocyanins in perry pears.
Chem. Ind. Lond., 1953, No. 47, p. 1260, bibl. 4.
In pear tannin.

j LÖHDEN, A.
Die Anbau- und Ertragsverhältnisse im Niederelbischen Anbaugebiet. **(Fruit growing in the Lower Elbe region.)**
Mitt. ObstbVersuchsrings Jork, 1954, **9**: 3-15.
Apples.

k MARINUCCI, M.
La "Butirra Clairgeau". **(Beurré Clairgeau pear.)**
Ital. agric., 1953, **90**: 767-8, illus.

l MIKEŠ, J.
Výsledky pozorování některých vlivů prostředí a jejich působení na vzrůst ovocných dřevin a opad ovoce. **(Observations on the effects of environment on the growth of fruit trees and on fruit drop.)** [Short Russian and German summaries.]
Sborn. čsl. Akad. zeměd. Věd, Ser. A, 1953, **26**: 199-204, bibl. 4.
A general discussion only, little detail.

m PLANK, R. [Editor].
Handbuch der Kältetechnik. IX. Band: Biochemische Grundlagen der Lebensmittelfrischhaltung. **(Handbook on the technique of refrigeration. Volume IX: The biochemical basis of the cold storage of food.)**
Springer-Verlag, Göttingen, Heidelberg, 1952, pp. 519, illus., DM. 96.–, from review in *Angew Bot.*, 1953, **27**: 82-3.
Including fruits.

n PLOCK, H.
Wege zur Gewinnung von reinklonigen Unterlagen. **(Methods of obtaining pure clones of rootstocks.)** [English summary 2 lines.]
Mitt. Klosterneuburg, Ser. B, 1954, **4**: 19-22, illus.
See *H.A.*, 23: 2545.

o PRESTON, A. P.
Improved yields with new woolly aphid resistant rootstocks.
Decid. Fruit Gr, 1953, **3** (11): 11-12.
See *H.A.*, 23: 162 and 2554.

p SHEAR, S. W.
State's fruit areas.
Calif. Agric., 1953, **7** (11): 3, 16.
Four major fruit and nut areas in California.

q STERLING, C.
Developmental anatomy of the fruit of *Prunus domestica* L.
Bull. Torrey bot. Cl., 1953, **80**: 457-77, bibl. 52, illus.
Histogenetic development in the prune after flowering.

r TIHONOV, N. N.
The appearance of pear-like fruits on apple trees. [Russian.]
Agrobiologija, 1952, No. 5, pp. 117-18, illus.
From 2 of Mičurin's apple varieties in Siberia.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(*See also* 1062-1065, 1078, 1147, 1159, 1211, 1295e, h, 1489, 1647c, 2102, 2111.)

1237. NEUMANN, U.
Untersuchungen über die Ursachen des vorzeitigen Früchtefalls bei schwarzen Johannisbeeren. **(Studies of the causes of running off in black currants.)**
Arch. Gartenb., 1953, **1**: 63-111, bibl. 54, illus.

A study of the causes of running off in black currants in 1949 and 1950 led to the following conclusions: (1) Self-pollination in black currants is insufficient; flower and fruit drop are therefore greater when conditions for pollination are unfavourable. (2) Artificial pollination increases fruit set and number of seeds per fruit; a correlation exists between number of seeds and weight of fruit. (3) An embryological examination of berries that had and had not dropped showed that the average number of ovules is higher in berries that had not dropped. Histological studies suggest that the drop of fertilized berries is primarily due to nutritional disturbance. Some ovules of dropped berries showed an inhibition of growth before they were ready for fertilization. (4) The basal flowers within a cluster are favoured as regards sequence of flowering and tendency to fruit. If the basal buds are cut off, the tendency to fruit increases in the terminal buds. A similar effect is obtained if the basal flowers are removed shortly after flowering. It appears that the differentiation of the terminal buds is reversible up to a certain developmental stage. (5) The removal of entire inflorescences does not reduce fruit drop in adjacent inflorescences. (6) Length of shoot is inversely related to fruit drop; severe pruning will therefore favour fruit drop by stimulating vegetative growth. Fruit drop is more pronounced in young, vigorous bushes than in old plants. (7) Girdling of the branches did not reduce fruit drop. (8) Observations revealed a rhythm of flower drop, premature and pre-harvest fruit drop which is almost identical in different varieties and localities. (9) Hormone treatment reduces the severe pre-harvest drop in the variety Rosenthal's Schwarze, but does not affect the less severe fruit drop in the variety Goliath. Of the growth substances tested, 0·001% naphthylacetic acid was the most effective. Flower drop was not affected by hormone treatment. (10) There are distinct varietal differences with regard to fruit drop almost irrespective of locality, Westwick Triumph being most prone and Black Naples least prone to the trouble in the locations examined. Varieties with short racemes seem to have less tendency to drop their fruit than those with long racemes. These specific varietal differences indicate the possibility of breeding higher yielding types less liable to fruit drop. (11) Differences in cultural treatment, in addition to soil conditions, appear as locality factors. Climatic factors (low temperatures) seem to have a greater effect on flower drop than on fruit drop. (12) Flower and fruit drop is determined by a complex of factors in which the part played by individual factors is not constant but depends

on environmental conditions. [Translation of author's summary.]—Erwin Baur Inst., Müncheberg, and Inst. Obstb. Obstzucht., Marquardt, near Potsdam.

1238. Sergeeva, K. D.
The vitality of seeds and hybrid plants of gooseberry and currant. [Russian.]
Agrobiologija, 1952, No. 4, pp. 123-5.
Data are presented showing that both gooseberry and currant hybrids resulting from pollination with a large amount of pollen were more vigorous and had more viable seeds than when only a small amount of pollen was used. In work with gooseberry, pollination with mixed pollen gave particularly promising results.

1239. Simonov, I. N.
A new raspberry hybrid. [Russian.]
Agrobiologija, 1951, No. 5, pp. 142-4, illus.
Seedling 4/7 (Kaliningradskaja pollinated with mixed pollen from Usanka, Marlborough and English) is described and illustrated. The fruit is of good quality and the plant is vigorous and hardy, suitable for central Russia.

1240. Hudson, J. P.
Propagation of plants by root cuttings. I. Regeneration of raspberry root cuttings.
J. hort. Sci., 1954, **29**: 27-43, bibl. 11, illus.
Some varieties of raspberries can readily be propagated from root cuttings. The method is more rapid than the traditional use of root suckers and might be useful in the initial multiplication of raspberry clones. Recommendations are made regarding choice and preparation of parent root material, method of making and planting cuttings, and subsequent management of the plants produced. The behaviour of raspberry root cuttings at various seasons and in different environments is described and discussed. [See also *H.A.*, 24: 206.] [Author's synopsis.]

1241. Hudson, J. P.
There is an off season for raspberry roots.
Grower, 1953, **40**: 1187.
Experiments have shown that when raspberry canes are pulled out or cut down to ground level in June the whole root system will die and the plants will not regenerate. This is due to the marked periodicity of raspberry roots in their capacity for forming new plants [see *H.A.*, 24: 206]. One practical application of this finding is that it enables growers to get rid of raspberries interplanted between top fruit. The work is being extended to determine whether certain noxious weeds show a similar periodicity in their capacity for regeneration.

1242. McGlumphy, J. H.
Fruit flavours.
Food Tech., 1951, **5**: 353-5, reprinted in *Perfum. essent. Oil Rec.*, 1953, **44**: 352-4, bibl. 36.
A combination of improved methods for the concentration of fruit flavours is described. The known aromatic constituents of the more important fruits are reviewed. A report of analytical findings is given, confirming and extending the known list of volatile flavouring materials naturally occurring in strawberries and raspberries. [Author's summary.]

1243. Luckan, J., von Sengbusch, R., and Schuppe, E.
Neuzeitlicher Erdbeeranbau. (**Modern strawberry culture.**)
Grundlagen u. Fortschritte im Garten- u. Weinbau, Hft 106, 4th Edition 1952, $8\frac{1}{2} \times 6$ in., pp. 87, illus., published by Eugen Ulmer, Stuttgart (at present Ludwigsburg), DM. 3.60.
In the tradition of the series this monograph covering all aspects of strawberry growing in Germany, including propagation and marketing, is written expertly and with care. The chapter on varieties, contributed by E. Schuppe, should be of interest to foreign readers in view of the illustrated descriptions of present-day German varieties, several of them only recently released. R. v. Sengbusch, the well-known strawberry breeder, and raiser of the Senga series of varieties, is responsible for the chapter on breeding (pp. 39–45). He regrets that at the time of writing too little attention was being paid in Germany to the certification of virus-free clones.

1244. Botley (Cheal, W. F.).
Final Report of Botley Fruit Station for 1951/52, 1953, pp. 25, bibl. 4, illus.
The 6 years work at Botley came to an end in September 1952. In addition to 2 papers abstracted separately, a general discussion of strawberry problems and notes on other fruits are included in this report.

1245. Cheal, W. F.
Early strawberries under cloches.
Fin. Rep. Botley Fruit Stat. 1951/52, 1953, pp. 19-23.
From results obtained at Botley with the variety Cambridge Favourite it is concluded that in England strawberries can be grown with success under cloches in their second year and can profitably be covered for 2 successive years. The optimum time for cloche covering appears to be the end of January and February.

1246. Cheal, W. F.
Fourth report of investigations of South Hampshire strawberry problems.
Fin. Rep. Botley Fruit Stat. 1951/52, 1953, pp. 2-16, illus.
In red core susceptibility trials the new variety C1 was outstanding for its vegetative vigour and high yield; no red core disease, *Phytophthora fragariae*, was seen on this variety, but it is sensitive to virus troubles. In green manure trials strawberries following red clover were the most vigorous, but there was no significant difference in yield as between treatments. Ridging increased both yield and vigour and reduced summer wilting in 1951, but in 1952 there was no great difference in yield as between ridged and unridged plants.

1247. Ljones, B.
Sortforsøk med jordbaer ved Norges Landbrukshøgskole. (**Strawberry variety trials at the Agricultural College of Norway.**) [English summary $\frac{1}{2}$ p.]
Forskn. Landbruk., 1953, **4**: 265-85, bibl. 19, illus., being *Meld. Inst. Fruktdyrk. Fruktkons. norg. LandbrHøgsk.* **26.**
Climax, which is considered promising, and three new

Danish varieties were among the varieties compared in three years' cropping trials.

1248. Fleming, H. K.
1952 strawberry variety trials in Erie County, Pennsylvania.
Progr. Rep. Pa agric. Exp. Stat. **95**, 1953, pp. 4.

During the dry season of 1952 Variety X, Kardinal King and Robinson were the highest yielding varieties.

1249. Anon.
Fraisier. (**Strawberry.**)
A.R. Conseil Exp. Rech. agron. Algér., 1952, pp. 164-7.

Promising varieties under trial in Algeria are Charles Simmen, Général Leclerc, Hâtive de Caen, Régal, Reine des précoces, Sans Rivale and Surprise des halles.

1250. Darrow, G. M.
Strawberries in Mexico, Central America, Colombia and Ecuador.
Ceiba, 1953, **3**: 179-85, from abstr. in *Fruits d'Outre Mer*, 1953, **8** (10), *Suppl. Fruits trop. subtrop.*, No. 10-5917.

Missionary is the only variety suitable for elevations between 750 and 1,800 m. and does best at 1,300–1,800 m. It should be compared with Parramos at 1,800–2,800 m. Ambato is hardy and drought-resistant but subject to leaf lignification; it has white flesh and not a very good flavour; Ambato-Parramos crosses might yield good results. Cultural notes are given.

1251. Šaškin, I. N.
Differences in specimens of one strawberry variety grown in various regions. [Russian.]
Agrobiologija, 1951, No. 4, pp. 124-8, illus.

Data provided for the variety Čudo Ketena grown at Leningrad, Saratov and in the Moscow region show that, while there was little difference in amount of the fruit components, the particular sugars varied considerable. Thus the Leningrad specimen had the highest glucose and lowest fructose content of the three samples. Other points discussed are variations in yield and the higher disease incidence of Saratov-grown strawberries compared with those grown in the Leningrad and Moscow regions.

1252. Vaile, J. E.
Fertilizing strawberries.
Ark. Fm Res., 1953, **2** (4): 4.

The results of fertilizer trials on first-year and older Blakemore strawberries at the Strawberry Substation, White County, Arkansas, indicate that 400 lb. 5-10-5 fertilizer per acre per annum is insufficient to maintain maximum yields. The application of 400 lb. 5-10-5 in June followed by 300 lb. in late winter gave better results than single applications of 700 lb. in June, September or late winter or than applications of 400 lb. in June and 300 lb. in September. Supplying additional N or K to the 5-10-5 fertilizer applied in June and late winter did not produce any further yield increases.

1253. Nesterov, Ja. S.
The effectiveness of applying granulated organo-mineral fertilizers to strawberries. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (5): 30-2.

In an experiment at Maikop in 1950 strawberries received the following fertilizer applications at 300 kg./ha. in May injected to depths of 20–25 cm.: (1) powdered superphosphate; (2) powdered superphosphate mixed with compost in the proportion 20: 80; and (3) 20: 80 superphosphate: compost mixture prepared in granular form with grains of 5–7 mm. in diameter. The last treatment gave the best yields not only in the year of application but also in the 2 years following, and promoted the best root development and highest N and P leaf contents.

1254. Wilson, D. J., and Rogers, W. S.
Trials of burning and mowing strawberry plants after cropping.
J. hort. Sci., 1954, **29**: 21-6.

Three trials are described in which strawberry plants were burnt or cut after cropping. The crop following burning was heavier than that of control plots, except when wilted plants were burnt. The crop after cutting was always greater than that from the controls. It appears that the advantages gained from these treatments are associated largely with the removal of the leaves themselves. In conclusion, burning after harvesting can be recommended as a cheap and beneficial practice most years. It is risky in severe drought and is not practicable if the straw is very wet and weedy. Cutting off the leaves, though not quite so cheap, offers similar advantages, involves no risk, and is practicable in all weathers. It can be recommended whenever burning is not suitable. [From authors' discussion and summary.]—E. Malling Res. Stat., Kent.

Vines.

(*See also* 1145n, 1146, 1159, 1235, 1295a, b, d, g, i, j, k, 2090.)

1255. Gallay, R.
Changins sur Nyon. Domaine d'expérimentation agricole et annexe scientifique des stations fédérales d'essais agricoles de Lausanne. (**Changins sur Nyon, an experimental farm and sub-station of the Federal Agricultural Research Stations at Lausanne.**)
Rev. romande Agric. Vitic., 1953, **9**: 93-4, illus.

In December 1952, the 18th century manor house and the 65 ha. farm of Changins sur Nyon were acquired by the Lausanne Research Station. The 5·5 ha. of vines on the estate are to be transformed into an experimental vineyard.

1256. Cosmo, I.
Problèmes généraux, scientifiques et techniques de viticulture. (**General, scientific and technical problems of viticulture.**)
Bull. Off. int. Vin, 1953, **26** (272): 105-35.*

The problems discussed are vegetative multiplication as a cause of degeneration, methods of improving rooting in cuttings, manuring, systems of training in relation to variety, soil, climate, latitude, altitude, etc., summer pruning, the performance of some wine and dessert varieties with abnormal flowers and means of ensuring good yields, breeding, rootstocks (R.99, Corriola and the Italian rootstocks) and ampelography.

* Being General Report read at the 7th International Vine and Wine Congress, Rome.

1257. Cosmo, I.
Orientamento per i futuri impianti viticoli nella zona del Raboso Piave in provincia di Treviso. (**Recommendations for future vine planting in the Raboso Piave district of the province of Treviso.**)
Agric. Venezie, 1953, **7**: 568-77, and *Riv. Vitic. Enol.*, 1953, **6**: 357-64, illus.

Adequate experimentation is essential for post-phylloxera reconstruction of vineyards, and to this end a network of experimental vineyards was established some years ago in the province of Treviso under the auspices of Conegliano Research Station with a view to testing 3–4 rootstocks in various environmental conditions with local and other scions. This work is now giving its first results and a report from the Raboso Piave district will be published in *Ann. Staz. sper. Vitic. Conegliano*. The following are advance notes on this report. (1) In the cool plains districts with normally rainy springs and rather cold winters the use of bench-grafted rooted cuttings is preferable to that of field-grafted rooted cuttings. (2) In ray training in the plains the final form should not be reached before the 7th or 8th year. (3) The sugar content of grapes from young vines is not below that of older vines. (4) The idea that grape quality is inversely related to vigour and yield has been confirmed only as regards sugar content. (5) Vigour and yield are directly correlated. (6) Other things being equal, a high yield year is not necessarily followed by a bad one. (7) There is no constant relationship between sugar content and acidity in any given vine plant. (8) In better quality soils of moderately heavy texture, not subject to drought or excessive moisture, the vines and especially the rootstocks have shown wide powers of adaptation and very uniform performance. Conclusions are given regarding the performance of individual scion and stock varieties.

1258. Cuccia, C.
Regards sur la viticulture sicilienne. (**A glance at Sicilian viticulture.**)
Bull. Off. int. Vin, 1953, **26** (274): 145-8.

The cultivation of dessert grapes is expanding but wine grape growing remains the basis of Sicilian viticulture. Brief notes are given on training, areas, production and other topics. Varieties are listed, by far the most important being the famous Zibibbo or Muscat of Alexandria which provides dessert grapes and raisins as well as wine.

1259. Fici, P.
La viticoltura e l'enologia nella economia di Pantelleria. (**Viticulture and oenology in the economy of Pantelleria.**)
Publ. Ist. reg. Vite Vino Palermo, 1953, pp. 47.

Pantellerian viticulture and wine making are based on the Zibibbo (Muscat of Alexandria) variety. The rootstocks chiefly used for reconstruction after the phylloxera invasion in 1930 were Sicilian-bred Berlandieri hybrids, notably Paulsen 775, 1447, 1103, 1045 and Ruggeri 140. As dependence on Zibibbo alone was undesirable, experiments with early dessert and seedless raisin varieties began in 1948-49. Almost all the raisins are produced by the alkali process.

1260. Misailovski, B.
Viticulture in the Tikveš region of Macedonia. [Yugoslav, with French summary.]
Annu. Inst. Rech. agron. Skopje, 1952, **1**: 113-41, bibl. 9.

The history of vine growing in the area is briefly reviewed including the introduction of American rootstocks, of which Chasselas × Berlandieri 41B is the most widely used, followed by Berlandieri × Riparia Teleki 8B and Rupestris du Lot. Notes are given on climatic conditions and on the composition of the must of different varieties. The characteristics of 26 varieties are described and their popularity is indicated.

1261. Artozoul, J., and Baudel, J.
La famille des Cots dans le sud-ouest de la France. (**The Cot group [of vine varieties] in south-western France.**)
Progr. agric. vitic., 1954, **141**: 14-21, 40-3, illus.

Ampelographical notes, together with identification keys, are given for the Cot varieties in south-western France. The varieties are the Cot type (called Malbec, Auxerrois, Pressac and Teinturin in different localities), Tannat, Mérille, Prunelard, Négrette, Valdiguié and Valdiguié pissaïre.

1262. Giordano, B.
Olivella Vibonese. (**Olivella Vibonese.**)
Ital. agric., 1953, **90**: 742-6, illus.

Notes are given on the much-prized, late-season Calabrian black dessert grape Olivella Vibonese and on its culture, including training, soil and rootstocks.

1263. Pogosjan, S. A.
On the vitality of the vegetative progeny of vine seedlings. [Russian.]
Agrobiologija, 1951, No. 5, pp. 101-10, bibl. 11, illus.

In preliminary greenhouse trials in Armenia a higher percentage of cuttings taken from seedlings of 4 vine varieties rooted than similar cuttings taken from the vegetatively propagated mother plants. In field experiments with the very old variety Voskeat the vegetative progeny of seedlings, with the exception of plants derived from seedling 7/15, were more vigorous, produced higher yields of better quality grapes and showed a higher rate of peroxidase activity than plants obtained from the mother plants. In a third trial cuttings of seedlings of Voskeat again showed improved rooting, more vigorous growth and better lignification than cuttings from the parent plants when grown at altitudes of 900 m. and 1,790 m.

1264. Pinelli, A.
Il costo di produzione delle barbatelle di vite innestate. (**The cost of producing grafted rooted vine cuttings.**)
Riv. Vitic. Enol., 1953, **6**: 365-8, 376-88.

The author makes a detailed study, item by item, of the costs of producing grafted, rooted vine cuttings in Venetia. In his example these range from 16·16 lire per cutting at 60% strike to 24·24 lire at 40% strike. Materials account for 23% and nursery labour 60% of the total cost. Possible means of reducing costs are outlined.

1265. Zuluaga, P. A.
Forzadura de estacas injertadas en vivero. **(Forcing grafted [vine] cuttings in the nursery.)**
Bol. Ext. Univ. nac. Cuyo **4**, 1952, pp. 14, illus.

The classic method of forcing grafted vine cuttings in boxes with heat is not satisfactory in Mendoza, since unfavourable climatic conditions result in high mortality on transplanting. A description is given of a simple method of nursery forcing in the open which gives 55–75% success. Whip-and-tongue grafted cuttings are planted at an angle of 45° in well-manured, sandy soil (preferably pure sand) in September–October at 0·05–0·10 by 0·80 m. Adequate watering and the prevention of scion rooting are important.

1266. Vega, J.
Injertos de la vid. Sistemas más difundidos. **(Vine grafting: the commonest methods.)**
Bol. Ext. Univ. nac. Cuyo **5**, 1953, pp. 74, bibl. 20, illus.

This well-illustrated bulletin describes the principles of vine grafting and the chief methods used in various parts of the world. Subjects discussed are the conditions necessary for success (temperature, humidity, air, season, tying), the *pros* and *cons* of bench-, nursery- and field-grafting, choice of material, preparation and storage of cuttings, grafting technique, forcing, and methods of cleft grafting, softwood grafting and semi-hardwood grafting, and budding.

1267. (Cuccia, C.)
Vigneti di piante madri in Sicilia. **(Vine rootstock nurseries in Sicily.)**
Publ. Ist. reg. Vite Vino Palermo, 1952, pp. 29.

The creation of adequate rootstock nurseries is a basic need for the rehabilitation of Sicilian vineyards. The chief rootstock varieties used should be the new Berlandieri hybrids bred in Sicily, especially Paulsen 775, 779, 1103, 1447 and 1045, and Ruggeri 140 and 225. Cultural and ampelographical information on these 7 hybrids is given in an appendix.

1268. Ponce, J. R., and Zuluaga, P. A.
Claves para un fácil reconocimiento de vides porta-injertos americanos más comunes en nuestra provincia. **(Keys for the ready identification of the American vine rootstocks most common in Mendoza.)**
Bol. Ext. Univ. nac. Cuyo **2**, 1952, pp. 28, bibl. 10, illus.

Ampelographical descriptions are given of the American rootstock species *Vitis riparia*, *V. berlandieri* and *V. rupestris* and some of their varieties; and of hybrids of the riparia × rupestris, berlandieri × riparia and berlandieri × rupestris groups, with keys to the common varieties.

1269. Vega, J., and Mavrich, E. G.
Identificación de clones en cultivos del portainjerto vitícolo Riparia × Rupestris 101/14 M.G. **(Identification of clones in mother plantations of the rootstock Riparia × Rupestris 101/14 M.G.)**
Idia, 1953, No. 66, pp. 17-25, bibl. 8, illus.

The lack of homogeneity in R.R. 101/14 mother plantations in Mendoza province leads to the conclusion that the material originally obtained from France actually consisted of several clones. The ampelographical characters of 5 of these clones are described.

1270. Ergesjan, R. A.
The effect of various rootstocks on the growth and productivity of vines. [Russian.]
Agrobiologija, 1952, No. 1, pp. 64-8, bibl. 1.

Out of 4 phylloxera-resistant rootstocks tested since 1946 in the Noemberjansk region of the Armenian Republic, Berlandieri × Riparia 5BB was found the most suitable for all 13 varieties used, producing high yields of good quality grapes.

1271. Carrante, V., and di Pruna, S.
Prove sperimentali sui portainnesti nell'impianto della vite a pergola e sulle successive pratiche colturali. (Risultati del primo triennio.) **(Rootstock and cultural trials with trellis-trained vines. First three years' results.)** [English summary 6 lines.]
Ann. Sper. agrar., 1953, **7**: 1915-40, illus.

Trials were conducted with Regina Bianca (or Mennavacca) trellis-trained vines to obtain information on rootstocks and the effect of spacing, manuring, drainage and irrigation. Among the 8 rootstocks tried 140 Ruggeri gave both the highest average yield and the highest average circumference of stem. Plants at 3 m. quincunx gave a higher average yield (7·49 kg.) than those at 2·5 m. quincunx (6·10) but the closer spacing gave the highest yield per ha. (112·6 kg. compared with 96·1). The average circumference of the stems was greater at the wider spacing. An annual NP dressing had little effect in the first 2 years but in the third there was a yield increase of 0·5 kg. per vine (10%) from manuring alone and 1 kg. (20%) from manuring plus irrigation. The effect of drainage with rubble was not significant. Irrigation plus manuring gave a yield increase of about 1·5 kg. per vine (28%) over the 3-year period compared with non-irrigation, while irrigation without manuring gave an increase of about 1 kg. per vine (20%). Notes are given on irrigation practice. 5BB and 420 A were the rootstocks which showed the greatest yield response to irrigation.—Staz. agrar. sper., Bari.

1272. Baranovskiĭ, A. L.
The rôle of microclimate in vine culture in new regions. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (6): 15-19, bibl. 2, illus.

At the Žitomir Agricultural Institute 3 methods of improving the microclimate of newly planted vines, by reducing wind velocity and increasing temperatures, have been developed. They are: ridging the land between rows and thereby planting the vines deeper, sowing blue lupin (*Lupinus angustifolius*) at a distance of 0·5 m. from the vines along the north side of the rows to form a live fence, and a combination of the 2 systems. In 1952 the crop of a number of varieties, particularly of early ones, sheltered by lupins ripened 7–10 days ahead of the controls.

1273. Hačatrjan, S. S., and Paronjan, G. H.
Growth and lignification of vine at different altitudes. [Russian.]
Agrobiologija, 1951, No. 5, pp. 148-51, bibl. 6.

Vine seedlings and hybrids, new clones and old varieties were grown at 1,150 m., 1,460 m., 1,550 m., 1,790 m. and 1,940 m. above sea level in Armenia. With increasing altitude, at the first 4 levels, the rate of growth was reduced but lignification increased. At 1,940 m. both growth and lignification appeared to be retarded in most of the plants tested. Plants of Mičurin's varieties and some hybrids, however, seemed to be better adapted to the severe conditions of high altitude than the rest, and even at 1,940 m., in spite of retarded growth, showed improved lignification, which led to increased hardiness.

1274. Manzoni, L.
Autogamia ed eterogamia della vite. (**Self- and cross-fertilization in the vine.**)
Riv. Vitic. Enol., 1953, **6**: 227-9, bibl. 4.

The author briefly considers the question of whether self- or cross-fertilization is more common in hermaphrodite self-fertile vines, and concludes that under normal conditions self-fertilization predominates but that a fairly high rate of cross-fertilization is always possible.

1275. Kolesnik, Z. V.
Formation of inflorescences in the spring. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 8, pp. 38-41, bibl. 5.

Data are presented showing that the number of inflorescences found in vine buds in late spring was higher than that found in similar buds the previous autumn. The development of inflorescences in the spring varied with variety, and in some cases unfavourable conditions (low temperatures in May) caused weakly differentiated inflorescences to develop as fruitless organs (tendrils).

1276. Stoev, K. D., and others.
The biology of vine laterals. [Russian.]
Agrobiologija, 1952, No. 6, pp. 92-100, bibl. 10.

Results of trials conducted in 1950–1951 with the most important Bulgarian vine varieties confirm the findings of Soviet workers who claim that satisfactory yields may be obtained on green side shoots. In the laterals of the variety Bolgar-Karaburnu intensive physiological activity was observed during late summer and early autumn. The rate of photosynthesis in the leaves of the laterals was 3–7 times as high, and transpiration twice as high as in the lower and middle leaves of the main branches. This led to improved nutrition resulting in very well developed fruit buds along the middle of the main shoots and lower part of the laterals.

1277. Negrulj, A. M.
The possibility of utilizing laterals in northern regions of vine growing. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 8, pp. 28-35.

A review of Russian work, supplemented by experimental data, on the rôle of lateral shoots. It is shown that the development of side shoots varies with variety and is generally encouraged by pinching back the main shoots. In the northern vine growing regions laterals only rarely produce fruit, but have a favourable effect on the development of dormant buds. The buds of the laterals are more frost-resistant and open later than those of the main shoots, and when the main shoot buds are destroyed by frost the lateral buds can replace them.

1278. Tjutjunik, A. F.
The rôle of laterals in the formation of dormant buds of vines. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 8, pp. 36-7.

Microscopical examination of dormant buds of 3 vine varieties has shown that where the side shoots were retained the embryonic shoots were longer and a larger number of nodes and inflorescences was present than where the side shoots were removed. It is recommended that laterals should be pinched back to an optimal number of leaves depending on variety, usually 6–7 in the northern regions of vine growing. [See also *H.A.*, 22: 1283.]

1279. Basanjko, A. A., and Turžova, M. P.
Basing the date of pruning on the assimilating activity of [vine] leaves. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 11, pp. 29-31.

Data are presented showing that the photosynthetic activity of vine leaves and the carbohydrate accumulation in vine shoots proceeds well into the autumn regardless of reduced temperatures. To obtain the greatest benefit from this late nutrition, which is important for wood maturation, it is recommended that vines, especially late varieties, should be pruned and covered for the winter only after the first frosts have damaged the leaves.

1280. Müllner, L.
Ödlandkultivierung im Weinbau durch Einsatz moderner Mittel. (**The re-establishment of vineyards on waste land by modern devices.**) [English, French, Spanish summaries.]
Mitt. Klosterneuburg, Ser, A, 1954, **4**: 17-30, bibl. 4, illus.

During the last 50 or 60 years many of the best vine sites on steep slopes in Austria have been abandoned owing to the difficulty of cultivation. The author describes the experimental re-establishment of vineyards on one of these sites. In this successful attempt terraces were constructed by modern soil-moving machinery, and explosives were used in place of ploughs.

1281. Kodenko, A. N., and Erygina, N. P.
The effect of side dressing on photosynthetic activity and yield of vines. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 8, pp. 41-2.

Vines receiving 4 side dressings of NPK in liquid form at 15 kg. active ingredients per 3,000 l. water per ha. had a higher rate of photosynthesis during the whole growing period and yielded 23% more grapes than the controls.

1282. ANSTETT, A.
Essais de fabrication de fumier artificiel de sarments de vigne. (**Composting experiments with vine shoots.**)
Ann. Inst. agric. Algér., 1953, Vol. 7, No. 6, 36 pp., bibl. 9, illus.

Studies in 1950 (*H.A.*, 22: 2265) showed that the composting of vine shoots was possible and that the resultant compost could play a valuable part in the fertilization of vineyards. Further composting studies in 1951 were concerned with humidity, size of material, heaping, nitrogen as a starter, and the use of phosphoric acid and potassium. A technique is recommended.

1283. MULCAY, W. D.
Enrich your vineyard soil with grape prunings.
Amer. Fruit Gr, 1953, **73** (12): 17, illus.

At Cornell, Ithaca, N.Y., 4 new rotary-beater machines, which cut vine prunings easily and quickly, have been tested. These machines are tractor-drawn and have whirling blades which cut the prunings as they lie on the ground into short lengths that can subsequently be chopped into still smaller pieces by a disc harrow. The small pieces decompose rapidly, thus putting fertility back into the soil.

1284. COOMBE, B. G.
Setting currants by spraying with P.C.P.A.
J. Dep. Agric. S. Aust., 1953, **57**: 107-10.

Parachlorophenoxyacetic acid is the most successful of 21 growth substances tested for currant setting since 1947. The results are equal to or better than those obtained by cincturing, but ripening is slightly delayed when fresh weight is high, and incidence of berry breakdown and mould following late rains is greater. Leaf distortion usually develops on late growth but rarely affects the vine. Application should be made when most bunches have lost their flower caps but the anthers have not dried up. The optimum concentration is 20 p.p.m. (just under $\frac{1}{3}$ oz./100 gal.) and the optimum rate is 1·5–2·5 pt per plant depending on size (50–100 gal./acre). The long-term effects are not known and growers are only recommended to make small-scale trials.

1285. LE ROUX, M. S.
Colour experiments with table grapes.
Fmg S. Afr., 1953, **28**: 375-6, 395, bibl. 5, illus.

Experiments conducted during 1952 and 1953, chiefly with the variety Barlinka, indicated that bunches enclosed while still immature in transparent bags developed colour similar to that of control bunches. In closed, dark bags ripening was delayed and bunches of Barlinka were not fully coloured, although those of some other varieties were. It is concluded that grapes grown for early market should be exposed to a fair amount of sunlight. J.S.

1286. LE ROUX, M. S.
Bunch weight of table grapes.
Fmg S. Afr., 1953, **28**: 358-60, bibl. 1, illus.

Weights of individual bunches of 14 of the leading export table grape varieties were compared and related to the requirements of the Select Grade. The majority of the bunches from most of the varieties came up to the requirements of the grade or could be made to do so by appropriate thinning, but under the conditions of the trial a large percentage of the bunches of Gros Noir, Almeria, Queen of the Vineyard and Red Hanepoot from both thinned and unthinned vines would not have satisfied these requirements. J.S.

Nuts.

(*See also* 1159, 1167, 1192, 1236g, 1295c, 2111.)

1287. HONDA, N.
On the soil acidity and the exchangeable-calcium of the chestnut orchard and chestnut wood soils. [Japanese, with English summary $\frac{1}{2}$ p.]
Sci. Rep. Fac. Agric. Okayama Univ. **2**, 1953, pp. 19-27, bibl. 22.

Analyses are given of samples from 2 soil types in good and poor chestnut sites. In one type there was little difference between the acidity and exchangeable calcium status in the good and poor sites, the figures being pH 4·6 and 0·016% in the former, and 5 and 0·014 in the latter. In the other type the figures were 4·6 and 0·085 in the good and 4·2 and 0·039 in the poor. It is concluded that chestnut will grow well even on soil with fairly low exchangeable calcium and is neither calcicole nor calcifuge.

1288. EVREINOFF, V.-A.
Les causes du rendement irrégulier chez le noisetier. (**The causes of irregular bearing in the cobnut.**)
Pomol. franç., 1953, **80**: 154-62, bibl. 11.

A review article. Successful results depend on cross-pollination. Mixed plantations of reciprocal pollinators are recommended.

1289. RJADNOVA, I. M.
The hardiness of large-fruited hazel nuts. [Russian.]
Agrobiologija, 1952, No. 1, pp. 153-5.

The frost resistance of 16 varieties of cultivated hazel and of the wild hazel, *Corylus avellana*, was tested at Krymskaja, Krasnodar region. The wild hazel was the most resistant and is recommended as pollinator for the cultivated varieties.

1290. HOPKINS, C. Y., AND CHISHOLM, M. J.
Some fatty acids of peanut, hickory, and acorn oils.
Canad. J. Chem., 1953, **31**: 1173-80, bibl. 12.

The oil of bitter hickory nut, *Carya cordiformis*, used as a representative of the Juglandaceae, was found not to contain a detectable amount of eicosenoic acid. It contained the following other fatty acids (expressed as percentages of total fatty acids): palmitic 6, stearic 1, higher saturated acid 0·5, oleic 72, and linoleic 19.

1291. SHARPE, R. H., AND GAMMON, N., Jr.
Fertilization of pecans.
A.R. Fla agric. Exp. Stats 1951/52, pp. 102-3.

Field trials show that, in general, pecans are slow to respond to fertilizers. In one trial no yield responses have occurred after 2 years, but foliage composition has begun to vary significantly with different treatments. Application of N has increased leaf-N, reduced leaf-P and accentuated Zn deficiency symptoms where both N and Zn were low. Application of P has increased

leaf-P, of gypsum has reduced leaf-Mg and of Zn has reduced leaf-N. In a 6-year-old trial applications of 5 and 10 lb. muriate of potash per tree have increased yields and leaf-K and reduced winter injury.

1292. Pech, H.
Le pistachier en Syrie. (**The pistachio in Syria.**)
Fruits d'Outre Mer, 1953, **8**: 479-87, bibl. 2, illus.
A botanical description is given of the 6 horticultural varieties of *Pistacia vera* found in Syria, namely Achouri, Batouri, Alemi, Lazaouardi, the rather uncommon white pistachio, and the rare Nab el Djemal. Notes are given on ecological conditions in the near neighbourhood of Aleppo to which pistachio growing is at present largely confined, on propagation (generally by seed, sometimes by grafting on *P. khinjuk*), on nursery and plantation practice, and on methods for expanding Syrian production.

1293. Limberk, J.
Další zpráva o pokusech s roubováním ořešáku vlásského. (**A further communication on methods of grafting walnuts.**) [Russian summary.]
Sborn. čsl. Akad. zeměd. Věd, Ser. A, 1953, **26**: 357-62, bibl. 2, illus.
Experiments were continued to study the possibility of vegetative propagation of walnuts in Czechoslovakia. Grafting of vegetative shoots was found unsatisfactory; ring budding was successful, but a modified chip budding was better. The latter method used in 2 slight variations in early April, both indoors and outdoors, showed very good promise, and the author recommends that the technique should now be tested in large-scale field trials.

1294. Scott, R. A.
Status of an Asiatic member of the Juglandaceae regarded as a "living fossil".
Amer. J. Bot., 1953, **40**: 666-9, bibl. 18.
The modern Asiatic species, *Juglandicarya*, cannot be considered as a "living fossil" in the sense of being a closely related survivor of any of the extinct species included in the genus *Juglandicarya*.

Noted.

1295.

a Arsoy, I.
Türkiye keru üzüm ve incirlerinin kimyevî terkipleri ve ispirto randimanlari. (**The chemical composition of Turkish raisins and dried figs and of the spirit they yield.**) [English summary ⅓ p.]
Tekel Enst. Raporlari, 1951, **6** (1): 125-38.
Analytical results are tabulated with notes in English.

b Australia.
Twenty-ninth Annual Report of the Commonwealth Dried Fruits Control Board for year 1952-1953, Melbourne, 1953, pp. 19.
Production and export figures for currants, sultanas and lexias.

c Chisholm, M. J., and Hopkins, C. Y.
Fatty acids of filbert oil and nasturtium seed oil.
Canad. J. Chem., 1953, **31**: 1131-7, bibl. 10, being *Contr. nat. Res. Coun. Canada* **3091.**

d Grill, F., and Wohlmuth, N.
Untersuchungen über den Gehalt an Kali, Phosphorsäure und Stickstoff von Weinreben. (**The potassium, phosphoric acid and nitrogen content of vines.**) [English, French, and Spanish summaries.]
Mitt. Klosterneuburg, 1953, **3**: 20-2, and *Ser. A*, 1954, **4**: 44-6, bibl. 3.
Tabulated data on the P, K and N content of vine shoots in two successive seasons.

e Hill, R. G., Jr.
Red stele resistant strawberries for Ohio.
Fruit Var. hort. Dig., 1953, **8**: 41-2, illus.
Fairland and Red Crop were the most promising.

f Lider, L. A.
Inheritance of resistance to a root-knot nematode (*Meloidogyne incognita* var. *acrita* Chitwood) in *Vitis* spp.
Proc. helminth. Soc. Wash., 1954, **21**: 53-60, bibl. 15.
Vitis solonis, champini, candicans, vinifera and *labrusca.*

g Maier, A.
Brevi cenni sulla situazione attuale della coltivazione della vite in provincia di Bolzano. (**Brief notes on the present position of viticulture in the Province of Bolzano.**)
Riv. Vitic. Enol., 1953, **6**: 301-6.
A review.

h Ministry of Agriculture, London.
Bush fruits.
Bull. Minist. Agric. Lond. **4,** 6th edition 1950, reprinted [with minor amendments] 1953, pp. 33, illus., 2s. 6d.

i Peyer, E.
Bodenproben aus dem Rebberg. (**Soil samples from the vineyard.**)
Schweiz. Z. Obst- u. Weinb., 1953, **62**: 463-6, illus.
Sampling procedure.

j Ribéreau-Gayon, P.
Différenciation des matières colorantes des raisins et des vins des cépages français et hybrides. (**Differentiation of the colouring materials in the grapes and wine of some French and hybrid vine varieties.**)
C.R. Acad. Agric. Fr., 1953, **39**: 800-7, bibl. 4.
Study and identification of anthocyanins by paper chromatography.

k Turkovic, Z., and Anicié-Bosnjak, Z.
L'habitat de la vigne "*Vitis silvestris*" en Yougoslavia.) (**Habitat of the vine *Vitis silvestris* in Yugoslavia.**)
Dtsch. Weinbau, October 1953, No. 5, from translation in *Progr. agric. vitic.*, 1953, **140**: 373-7, illus.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

(*See also* 1080, 1145n, 1228-1230, 1296, 1435r, 2081, 2082, 2110, 2112, 2119k.)

1296. Ministry of Agriculture, Londqn (Aitkenhead, P., and Tomlinson, J. A.).
Diseases and pests on horticultural planting material. A guide to their recognition.
Publ. Minist. Agric. London, 1953, 8½ × 5½ in., pp. 38, illus., 6s.

The horticultural plants commonly found moving in international traffic with special reference to the U.K. are listed. Under each plant the diseases and pests which might be found on planting material are named and their chief diagnostic features are briefly given. Many [83] are also clearly and usefully illustrated. Most of the notes refer to the symptoms noticeable on dormant or semi-dormant material.

1297. Hoffman, A.
Répertoire analytique des espèces animales nuisibles aux cultures en France (Métropole et Départements d'Outre-Mer) ayant présenté d'intéressantes particularités en 1952. **(Annotated list of pests which were of particular importance in metropolitan and overseas France in 1952.)**
Ann. Épiphyt., 1953, **4**: 423-33.

The term pests covers insects, nematodes, rodents and birds. Part I is concerned with new species and those causing abnormal damage, and Part II with major outbreaks.

1298. Gorlenko, M. V.
The immunity of plants to diseases and pests. [Russian.]
Priroda, 1953, **42** (10): 94-6.

The rôle of hybridization, vegetative hybridization, selection and environmental conditions in the development of disease-resistant plants is discussed with appropriate examples. Loss of resistance due to degeneration of varieties and formation of new races of pathogen is considered, and it is mentioned that foliar application of fertilizers and micro-elements improves resistance to a number of diseases. With regard to pests only the distinction between resistance and tolerance is noted.

1299. Anon.
1954 spray recommendations for tree fruits in eastern Washington.
Ext. Bull. St. Coll. Wash. Ext. Serv. **419**, revised 1954, pp. 32, illus.

In addition to providing concise spray programmes for controlling pests and diseases, mainly of apples, pears, peaches and cherries, this bulletin is of interest as containing practical recommendations on chemical thinning sprays for apples, hormone sprays to control fruit drop in apples and pears, and the application of nutritional sprays (Zn, B and urea).

1300. Jacks, H., and others.
Orchard spray trials in 1952-53.
Suppl. Orchard. N.Z., November 1953, pp. 11, bibl. 2.

The results are summarized of 24 experiments on pest and disease control in apples (20 tests), pears (2), peaches (1), and lemons (1).

Disturbances of nutrition or of unknown origin.

(*See also* 1121, 1122, 1237, 1291, 1435a, c.)

1301. Scaramuzzi, G.
Alcune carenze nutrizionali sperimentali del pesco in rapporto ai sintomi fogliari di leptonecrosi. **(Some experimentally induced nutritional deficiencies in peach in relation to the leaf symptoms of leptonecrosis.)** [English summary 11 lines.]
Ann. Sper. agrar., 1954, **8**: 77-94, bibl. 35, illus.

Four different groups of symptoms were exhibited by peach seedlings experimentally raised in very poor sandy soil. The commonest group of leaf symptoms, of which the chief is upward and inward curling of the leaf margins with a vinous-red discoloration of the margin of the lower surface, is characteristic of the peach leptonecrosis of Verona; PK fertilization effected a cure. The 3 other groups of symptoms, also described, were found to be due to deficiency of N, K and Ca respectively.—Lab. crit., Pavia.

1302. Russell, W. A.
The lime-induced chlorosis problem at the Indian Head Experimental Farm.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 116-19.

Lime-induced chlorosis is a serious problem in the orchards and arboretum at the Experimental Farm, Indian Head, Saskatchewan, on heavy clay soil with a pH of about 7·4. Control measures using iron sprays and injections have given some remedial effect but have not proved entirely satisfactory. Resistant material in apple has not been found in local orchards. Planting 20 varieties on a common rootstock failed to disclose any varietal difference in susceptibility to the conditions causing lime-induced chlorosis. No variety or species in the plum orchard could be considered resistant to chlorosis. Classification of ornamental trees and shrubs according to their resistance to chlorosis is being undertaken. [From author's summary.]

1303. Mulder, D.
Magnesiumgebrek en andere oorzaken van chlorose en necrose. **(Magnesium deficiency and other causes of chlorosis and necrosis in fruit trees.)** [English summary ¼ p.]
Meded. Dir. Tuinb., 1953, **16**: 878-82, illus.

Notes are given on some of the reasons for chlorosis and necrosis in top fruits, including nutrient element deficiencies, virus diseases, and hereditary factors. It is mentioned that bark split of plums and a bark necrosis of pears on quince C stocks, both shown by Posnette to be virus diseases, occur in the Netherlands. Excellent coloured plates show leaf symptoms of Mg deficiency in pear, cherry and plum, K deficiency in pear, Zn deficiency in plum, mosaic virus in apple and hereditary chlorosis in pear.

1304. Stellwaag, F.
Symptome des Magnesiummangels an Reben. (**Symptoms of magnesium deficiency in vines.**) [English, French, Spanish summaries.]
Mitt. Klosterneuburg, Ser. A, 1954, **4**: 37-44, bibl. 12, illus.

Well defined, characteristic symptoms of magnesium deficiency, very similar to those observed in fruit trees and vegetables, were produced in vines grown in sand and water cultures. The degree of symptom expression and in some cases also the nature of the symptoms exhibited were found to be markedly influenced by the composition of the nutrient solution or even by the ratio of nutrients present in the solution. The author concludes that in view of the complex factors involved an accurate diagnosis of Mg deficiency by soil analysis or visual symptoms is not possible in the vineyard, unless these methods are supplemented by nutrient solution studies.—Geisenheim.

1305. Lafon, J., and Couillaud, P.
Essais d'alimentation foliaire de la vigne (cas de la potasse). (**Vine foliar nutrition tests: potassium.**)
C.R. Acad. Agric. Fr., 1953, **39**: 725-8, bibl. 6.

Foliar nutrition tests were conducted in 1953 on 4-year-old Ugni Blanc on 3309. The vines showed distinct yellowing believed to be due to potassium deficiency attributable to the inherent poverty of the soil, its high retention of potassium and its dryness at root level. A 7% aqueous solution of potassium sulphate was applied at the rate of 0·5 l. per vine on 1, 6, 12, 18 and 25 August. Disappearance of symptoms began on 15 August and continued progressively. The average yield was 1·588 kg. per plant compared with 0·882 kg. in the control, and leaves were retained longer.

1306. Manaresi, A.
Osservazioni sulla stanchezza del terreno per le piante legnose. (**Notes on soil sickness in woody plants.**)
Tipografia Compositori, Bologna, 1952, pp. 58, bibl. 177.

Part I is a review of the literature on soil sickness and its effect on herbaceous plants. Part II consists of a similar but shorter review for woody plants and an account of the author's own observations on woody plants extending over 23 years. The long bibliography covers literature from many lands. [*H.A.*, 24: 258 relates to a summary (with additions) of this paper.]

1307. Albrecht, D.
Bodenmüdigkeit in Baumschulen. (**Soil sickness in the nursery.**)
Dtsch. Gärtner-Post, 1953, No. 37, from abstr. in *Gartenwelt*, 1954, **54**: 27.

The author has evolved a method of growing apple seedlings in the laboratory in an undisturbed soil profile for the rapid diagnosis of soil sickness. A column of soil, 40 cm. deep and 15 cm. in diameter, is cut out by a specially constructed auger and dipped into hot paraffin wax which after cooling serves as a container. About 3 months after sowing the apple seed the soil is washed from the roots, the development of which is an index of the soil condition. In a later modification of this technique different strata of the soil profile were dipped separately in paraffin. This refinement reduced the time needed for the diagnosis of disorders in each soil layer to 3–4 weeks. The improved method is considered to have great practical significance.—Inst. Gartenbau, Dresden-Pillnitz.

1308. Karnatz, H.
Über die Wirkung des Nachbaues von Apfelsämlingen nach Apfelsämlingen in der Unterlagenbaumschule. (**The effect of raising apple seedlings on land planted with apple seedlings the previous year.**)
Mitt. ObstbVersuchsrings Jork, 1953, **8**: 288-90.

The data presented show the adverse effect on seed germination and seedling growth of raising apple seedlings on the same land two successive years. Of apple seedlings grown on unmanured soils that had been cropped with apple seedlings, pear seedlings and potatoes the previous year, 24·5%, 8·1% and 1·5% of the plants had a stem diameter of less than 4 mm., the average diameter being 5·39, 6·12, 7·20 mm. respectively. Manuring reduced the differences between results of pre-treatments but did not cancel them. The trial also showed the value of stable manure applications in the rootstock nursery.

1309. (Gardner, V. R., and Christ, E. G.)
Stayman cracking.
Hort. News, November 1953, condensed in *N.J. Agric.*, 1953, **35** (6): 13-14, illus.

Studies in New Jersey in 1953 have shown that cracking in Stayman apples was 5 times as prevalent in russeted, and 8 times as prevalent in severely russeted, fruits as in non-russeted. Considerable differences have been observed in cracking from orchard to orchard, from tree to tree and sometimes from branch to branch. In the belief that some of these differences may be due to genetic rather than physiological causes, material from unaffected trees and branches is being selected for propagation.

1310. Scaramuzzi, G., and Ciferri, R.
Descrizione di fenomeni di allofillia in alcune drupacee. (**Description of allophylly in some stone fruit trees.**) [English summary 7 lines.]
Ann. Sper. agrar., 1954, **8**: 95-111, bibl. 14, illus.

Allophylly in peach, cherry and apricot is discussed. Evidence suggests there are 2 types: one which is not transmissible by vegetative propagation and of which the cause is unknown, and one, often called "bud mutation", which is so transmissible and which may be due to virus.

1311. Smith, L. C.
Apricot gummosis investigations. Progress report, 1951-53.
J. Dep. Agric. S. Aust., 1953, **57**: 64-5, illus.

Trials over a 3-year period show that bordeaux spraying does not control gummosis. As unpruned trees are almost gummosis-free, modified pruning trials have been started in an attempt to reduce gummosis losses.

Climatic factors.

(*See also* 1081-1085, 1128, 1180, 1184-1189, 1203, 1356 1435n, 1811, 1848, 2088, 2091.)

1312. Faivre, M.
Une seconde année d'expérimentation contre les gelées printanières en arboriculture. (**A second year's trials of spring frost protection methods.**)
Rev. hort. Paris, 1953, **126**: 1004-8, illus.
Poursuite d'une étude sur le problème des gelées printanières. (**Further trials on spring frost protection methods.**)
Arboric. fruit., 1954, No. 1, pp. 12-13.

These are identical articles. In 1953 further experiments were carried out in the Rhône Department, France, with the 3 types of frost control apparatus previously tested in 1951 [*H.A.*, 23: 385], namely Gelivore oil stoves (at 200 per ha.), the Parrenin apparatus (generating heat, smoke and carbon dioxide, at 12/ha.), and the Frostguard (radiant heat, 5/ha.). As 1951 was a year of mild and 1953 a year of hard late frost, the types of equipment have been tested under a wide range of conditions and a thorough appraisal of their capabilities is possible. Taking both external conditions and economic considerations into account, the order of merit of the 3 systems was found to be: oil stoves, Parrenin apparatus, Frostguards. The oil stoves have the merits of cheapness (the stoves and ancillary equipment for 1 ha. cost less than a single Frostguard) and reliability in raising the temperature. The Parrenin apparatus acts more by smoke emission than heat generation and its efficacy in hard frosts is problematical; heat generation is not constant owing to the excessive production of soot which has to be cleaned away every half hour. The Frostguard has the great disadvantage of high cost and is not so effective in light as in hard frosts.

1313. Witte, K.
Frostschadenverhütung. Verfahren, Erfolge und Wirtschaftlichkeit. (**The prevention of frost injury. Methods, results and economics.**)
Reprinted from *Mitt. dtsch. LandwGes.*, 1953, Nr. 32/33, pp. 4, bibl. 1, illus.

Erfolgreiche Frostabwehr durch Beregnung. (Unter besonderer Berücksichtigung des Jahres 1953.) (**Successful frost protection by sprinkler irrigation, with special reference to 1953.**)
Reprinted from *Landw. Z. Nord-Rheinprov.*, 1953, Nr. 33, pp. 3½, illus.

Beregnung, die einzig sichere Frostschutzmethode. (Unter besonderer Berücksichtigung neuer Feststellungen und Beobachtungen in den Jahren 1951-1953.) (**Sprinkler irrigation, the only certain method of frost protection, with special reference to new findings and observations in 1951-1953.**)
Schweiz. Gärtnerztg, 1953, **56** (52): 1-3, illus.

These 3 articles, nearly similar in content, present data on: (*a*) the irrigation in April 1951, of pears in blossom during a frost of −3·4° C. (at 2 m. above ground level) resulting in an increase in fruit set of 34%; (*b*) the protection of early potatoes in spring 1952; and (*c*) the irrigation of tomatoes and early potatoes during a long frost of −4° C. (at ground level) on the night of 10/11 May, 1953. The treated tomato plants, which were planted on 4 May, entirely escaped damage, while the controls failed to recover from the foliage injury sustained.—Bonn. Univ.

1314. Hirt, W.
Wirksamer Frostschutz durch Beregnung. (**Effective frost protection by irrigation.**)
Schweiz. Gärtnerztg, 1954, **57** (5): 6-7, illus.

On the night of 10/11 May, 1953, when the temperature at Küsnacht, Switzerland, dropped to −5° C., strawberries, lettuce and cauliflowers were protected from frost damage by continuous sprinkler irrigation. Conditions for successful treatment are: (1) The water output must not exceed 2 mm. per hour to avoid injury from the weight of ice formed; (2) irrigation must be started at a temperature of +2° C. and continued until all the ice has thawed; (3) the treatment must not be interrupted for more than 3 minutes at a time.

1315. van Eimern, J., and Loewel, E. L.
Frostschutzversuche mittels Propeller. (**Experiments on frost protection by fan.**)
Mitt. ObstbVersuchsrings Jork, 1954, **9**: 22-30, bibl. 4, illus.

Temperatures in the vicinity of a fan installed in an apple spindle bush plantation were recorded during a frosty night in May 1953. Detailed graphs are also presented on the air currents produced by the fan.

1316. Zaharova, E. I.
Conditions promoting spotted necrosis of vines. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 11, pp. 35-9, illus.

Spotted necrosis is the most widespread type of winter injury of the aerial parts of vines grown under conditions of winter covering. Observations and experiments have shown that winter injury is due not only to the direct action of frost but to a complex of external conditions. High moisture content of the covering soil and sharp fluctuations of temperature, particularly towards the end of the dormant period, appear to have the most serious effects, and older branches seem to suffer more than younger shoots or buds.

1317. Gigante, R.
Ricerche preliminari sul mal del piombo non parassitario del pesco in provincia di Ravenna durante gli anni 1949 e 1950. (**Preliminary research on the non-parasitic silver leaf disease of peach in the province of Ravenna in 1949 and 1950.**) [English summary 14 lines.]
Boll. Staz. Pat. veg. Roma, 1952 [issued 1953], **10**: 3-16, bibl. 22, illus.

Two forms of silver leaf occur in the province of Ravenna: the parasitic disease caused by *Stereum purpureum* and a non-parasitic form. The symptoms of the latter are a silvering of the leaves, dieback and, in serious cases, leaf rosetting. The cause is not known, but incidence is correlated with frost.

1318. KIRILLOV, F. F.
Methods of protecting vineyards from winter injury. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 10, pp. 36-40.

Experiments with 3 vine varieties have shown that, of 4 types of protective covering tested, a layer of organic material (straw, dry leaves) plus a layer of soil was the best, and was followed by the highest yields the following season. The rôle of the organic material is twofold: in areas with very low winter temperatures it is applied in a thick, 8–10 cm., layer and serves as protection against cold, but where the winters are relatively mild with fluctuating temperatures it is applied in a 3–4 cm. layer and effectively regulates the water-air balance of the mound. The soil is usually applied in a 20–30 cm. layer.

1319. KIRILLOV, F. F.
Autumn and winter injury of vine buds. [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 9, pp. 38-40.

The effects of seasonal weather conditions on the frost resistance of vine buds are discussed. In a trial with 4 varieties it was observed that the majority of buds killed in early winter were those that grew on the centre of the shoots and were the best developed. They were completely differentiated, had very fine meristematic tissue and were not hardened, and hence were susceptible to low temperatures. Methods of preventing the loss of these most valuable buds by pruning, training and covering with organic materials are recommended.

1320. EVANS, W. D.
Histological work in association with water losses of woody twigs.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 68-70, bibl. 12.

Studies of water loss from woody plant tissues indicate that factors which influence transpiration in plants may have an effect upon winter injury due to desiccation. A project proposed to study one of these factors is outlined. [From author's summary.]

1321. BLAHA, J.
Sprchání květu u révy vinné v roce 1949 a jeho příčiny. **(Flower drop of vines in 1949 and its causes.)** [Russian and French summaries.]
Sborn. čsl. Akad. zeměd. Věd Ser. A, 1953, **26**: 205-12, bibl. 2.

During observations in southern Moravia a direct connexion was established between flower drop and weather conditions prevailing before and during flowering. A list of 167 varieties is given with indications of their degree of resistance to flower drop. The view that early flowering varieties are more susceptible to drop was not confirmed. Flower drop in 1949 was due to the reduced flow of sugar into the inflorescence caused by unfavourable weather conditions which checked flower development. A study was also made of rootstock effects, and it is shown that varieties grafted on Aramon × Rupestris Ganzin No. 1 were the most resistant to drop and those on *Vitis solonis* and its crosses the most susceptible. For control of flower drop, reduced N fertilization and modified pruning and training are recommended.

1322. TERRIER, C., AND STAEHELIN, M.
La brunissure de la vigne. **(Leaf browning in the vine.)**
Rev. romande Agric. Vitic., 1953, **9**: 88-90, bibl. 13.

The leaf browning which became prevalent throughout French-speaking Switzerland (except Valais) at the end of August 1953 is the same as that which has been experienced at intervals in the past. It appears to be related to prolonged high temperatures coinciding with excessive exposure to the sun and with dry weather. Local variations in injury are apparently due to vigour, soil and cultural practice but not to varietal differences. Tentative recommendations are to maintain growth by manuring, avoid packing the soil, avoid pruning during sunny periods when the fruit is starting to ripen, and to use bordeaux mixture for fungicidal treatments applied after flowering.

1323. MONTANARI, V.
A due anni dal disastro. La ricostruzione del Polesine e del Cavarzerano sommersi dall' alluvione del Po. **(Two years after the disaster. Reconstruction in the Polesella and Cavarzere districts inundated in the Po floods.)**
Agric. Venezie, 1954, **8**: 12-38, illus.

This general account of reconstruction after the 1951 Po floods briefly mentions the effect of immersion on woody horticultural plants. Mortality was greatest in peach, followed by pear, apple, and vine; the last withstood submergence better than was expected. Mortality was also great in *Robinia* and mulberry.

1324. GEORGE, E. J.
31-year results in growing shelterbelts on the Northern Great Plains.
Circ. U.S. Dep. Agric. **924,** 1953, pp. 56, bibl. 23, illus.

Information is given on shelterbelt growing in the arid Northern Great Plains (rainfall 15 in., of which three-quarters falls in April–September) under the following heads: selection of site, land preparation, selection of tree and shrub species for interior rows and outer windward and leeward rows, number of rows (generally 5–10), spacing (12–18 feet between rows and 6–8 feet between trees in the row), planting, replanting, cultivation, protection and extra water.

1325. HENDRIX, J. W., AND OTHERS.
Influence of date of collection and distance from pollution source upon foliar fluoride content of apple, cherry, and prune.
From abstr. in *Phytopathology*, 1953, 43: 587.

Analysis of samples from an air pollution centre revealed foliar fluoride concentrations ranging from 13 to 1,034 p.p.m. on a dry weight basis and a relationship between species, date of collection and distance from pollution source. The average foliar fluoride content of apple, cherry, and prune was 194, 185, and 245 p.p.m. respectively. Between July, when the first series of collections was made, and September, when the second series of collections was made, an increase of 43, 104 and 107 p.p.m. was recorded for apple, cherry and prune, respectively. As one left the source of pollution, the average fluoride content, at 1-mile

intervals, was 391, 545, 322, 233, 119, 90, 85, 72, 58, 57, 46, and 41 p.p.m. respectively, for all species combined. The data failed to show a consistent relationship between the fluoride content and degree of plant injury recorded at the time of sample collection.

Viruses.

(*See also* 1303, 1310, 2087.)

1326. VAN KATWIJK, W.
Rozet, een nieuwe virusziekte bij appels. (Apple rosette, a new virus disease.) [English summary 6 lines.]
Tijdschr. PlZiekt., 1953, **59**: 233-6, bibl. 16, illus.

In 3 orchards in Holland abnormal symptoms of leaf rosetting, leaf distortion and sterility were observed on some trees of the apple variety Belle de Boskoop. By means of grafting these symptoms were transmitted to healthy trees of the same variety and probably also to Jonathan, the virus nature of the disease being thus proved. The name suggested for the disease is Apple rosette.—PlZiektenk. Dienst, Wageningen.

1327. VAN KATWIJK, W.
Enkele waarnemingen over de rubberziekte van appels. (Some observations on rubbery wood virus disease in apples.) [English summary ½ p.]
Meded. Dir. Tuinb., 1954, **17**: 31-6, bibl. 5, illus.

In the Netherlands symptoms of rubbery wood infection have been found in the varieties James Grieve and Jonathan as well as in Golden Delicious and Lord Lambourne. Anatomical studies of infected wood sometimes suggest that infection may have occurred from outside but it is not known whether there is an insect vector of the virus. An account is given of certification measures taken for the control of this disease in the Netherlands.

1328. POSNETTE, A. F.
Virus diseases of cherry trees in England. I. Survey of diseases present.
J. hort. Sci., 1954, **29**: 44-58, bibl. 21, illus.

Virus diseases found in cherry trees in England are described in six groups: rosette, rasp leaf, tatter leaf, chlorotic mottles, rusty mottle and yellows. All these diseases, except rasp leaf, are prevalent, and the aggregate loss of crop may be considerable, but there are no yield records from which it can be estimated. Most orchard trees are infected with one or more viruses, and selection and testing is proceeding to obtain virus-free material of important varieties. Transmission to different *Prunus* species has shown which hosts are useful test plants for the particular viruses concerned, the mazzard clone F12/1 being the most valuable as a general indicator. [Author's summary.]—E. Malling Res. Stat., Kent.

1329. COCHRAN, L. C., AND JONES, L. S.
Correlation between natural spread of peach mosaic and age of infection in the donor tree.
From abstr. in *Phytopathology*, 1953, **43**: 585-6.

Repeated occurrence of sudden outbreaks of rapid natural spread of peach mosaic in experimental plots has been associated with retention of diseased trees for more than 1 year. In experiments the absence of spread near trees in the first year of disease and rapid spread near trees diseased for 2 years demonstrated the existence of factors associated with age of infection that limit acquisition of the peach mosaic virus by the vector.

1330. JENSEN, D. D.
Leafhopper-virus relationships of peach yellow leaf roll.
Phytopathology, 1953, **43**: 561-4, bibl. 5.

Tests with *Colladonus geminatus* included level of acquisition in various acquisition feeding periods and of subsequent transmission, period of retention of virus, and incubation period in glasshouse Lovell peach seedlings.—Dep. Ent. Parasit., Univ. Calif., Berkeley.

1331. HUTCHINS, L. M., AND OTHERS.
Transmission of phony disease virus from tops of certain affected peach and plum trees.
Phytopathology, 1953, **43**: 691-6, bibl. 5.

Transmission of peach phony disease with scions has shown that the virus, which was believed to be restricted to the roots, can exist in the tops of infected trees. Transmission from certain affected trees and from certain arms on affected trees but not from others indicates that the causal virus is not uniformly distributed in the tops. Scions taken from trees grown from virus-bearing scions gave consistent transmission, indicating that when the virus invades the growing point it becomes more uniformly distributed in subsequent tissue, and that once in the tissue some of it remains there. Preliminary results indicate that the virus may not move into tops or moves very slowly into tops of peach trees inoculated in the roots. The virus appears to be more generally distributed in the tops of affected plum trees than in those of peach.—Plant Industry Stat., Beltsville, Maryland.

1332. GRANITI, A.
Il mosaico del fico in Italia e il suo probabile vettore. (Fig mosaic in Italy and its probable vector.) [English summary 4 lines.]
Riv. Fruttic., 1954, **16**: 22-5, bibl. 15, illus.

Aceria ficus, observed during the last 2 years in various parts of Italy on *Ficus caricae*, is suggested as a possible vector of fig mosaic.

Bacteria.

1333. GOODMAN, R. N.
Antibiotics, a new weapon for fire blight control.
Amer. Fruit Gr, 1953, **73** (11): 7, 16-17.

In trials in Missouri in 1952 streptomycin and terramycin applied alone or combined gave very promising control of fire blight on Jonathan apples. Best results were obtained where the spray programme was started at bud burst (22 April) or when 30–50% of the flowers were open (27 April). The necessary number of applications has not yet been established.

1334. STACE-SMITH, R., WOOLEY, P. H., AND VAUGHAN, E. K.
A new disease of cultivated blueberry.
From abstr. in *Phytopathology*, 1953, **43**: 589.

A description is given of a serious stem canker (*Pseudomonas* sp.) of blueberry (*Vaccinium australi*) in Western Oregon. Susceptible, resistant and highly resistant varieties are listed.

1335. Engelbrecht, D. J.
Trends in "vlamsiekte" research.
Decid. Fruit Gr., 1953, **3** (11): 13-14, illus.

The vlamsiekte bacterial disease [*Erwinia vitivora*], of which the worst effect is a general weakening of the plant, has recently spread widely in the dessert grape growing districts of the Western Province of S. Africa. The bacteria are carried long distances on rain winds. Primary infection occurs through leaf tips; wounds are also a point of entry. Continued damp warm weather in spring and early summer favours infection. In recent control tests the infection rate at harvest time was lowered by 4 fortnightly spring sprayings with 1% bordeaux mixture plus a spreader or with captan (0·25% active ingredient) beginning when foliation was well advanced (shoots about 2 in. long). Waltham, Barlinka and Queen of the Vineyard—the most important dessert varieties—are all susceptible.

Fungi.

(*See also* 1246, 1435f, h, l.)

1336. Vergara Castillo, C.
Un aporte al estudio de campo y de laboratorio del hongo *Nectria galligena* Bres. **(A contribution to the field and laboratory study of the fungus *Nectria galligena*.)** [English summary ¾ p.]
Agric. téc. Chile, 1953, **13**: 62-85, bibl. 16, illus.

Canker is the most serious apple disease in Chile, especially in the south where environmental conditions suit *Nectria galligena*. All the varieties cultivated are susceptible, the most susceptible being Delicious, Yellow Newtown and the Reinettes (with some exceptions including Gravenstein), while Hoover and the wild apple used for rootstocks are more resistant. Notes are given on the morphology, etiology and host range of the fungus and on control measures based partly on Chilean experiments.

1337. Perrier, E.
Le chancre du pommier dans le Haouz. **(Apple canker in the Haouz district [of Morocco].)**
Terre maroc., 1953, **27**: 377-82, illus.

Notes are given on the symptoms, spread, ecology and control of *Sphaeropsis pseudodiplodia* var. *voglioni* in the Haouz district. The following conclusions are drawn from 2 years' control experiments. (1) The trees react well to winter and spring surgery of diseased tissue, but deep cleaning followed by disinfection with a mercury fungicide is necessary. (2) Multiple stems (resulting from the local practice of planting several trees in a clump) require thinning to preclude rubbing and the breaking of slender branches. Single stems should be branch thinned. The periodical removal of suckers, and ridging to prevent irrigation water coming into contact with the collar, are practices indispensable to good growth. From the point of view of canker prevention single-stem is preferable to multiple-stem training.

1338. Soenen, A., and Aerts, R.
Meeldauw op appel. **(Apple mildew.)**
Fruitteelt, 1954, **44**: 126-7, illus.

The results are recorded of recent Belgian investigations on the life history and control of the apple mildew fungus. Spraying with micronized sulphur was the best curative measure but did not give complete control. There are indications that several preventive sprays of micronized sulphur during May and June, together with pruning out infected wood in winter and spring, will give the best results.

1339. Andrén, F.
Besprutningsförsök mot äppleskorv och äpplemjöldagg 1953. **(Spraying trials against apple scab and apple mildew in 1953.)**
Växtskyddsnotiser, 1953, No. 5/6, pp. 82-5.

In the 1953 fungicide tests against apple scab SR 406 (N-trichloromethylthiotetrahydronaphthalimide) proved superior to other organic compounds, bordeaux and wettable sulphur. Applications of wettable sulphur plus spreader were found to control apple mildew satisfactorily.

1340. Jeffery, M. W.
Preliminary investigations into the life cycle of *Venturia inaequalis* (Cooke) Wint. in South Australia.
Aust. J. agric. Res., 1953, **4**: 415-22, bibl. 6, illus.

Sources of primary infection, such as lesions on one-year-old wood or overwintering superficial conidia on the trees, do not appear important. Bud-scale infection of dormant buds has been shown, and its relative importance is discussed. Ascospores are the most important source of primary infection. Their period of discharge extends to a later date than previously reported for South Australia and is considered in relation to leader shoot and late summer spot infection. [From author's summary.]—Waite agric. Res. Inst.

1341. Keyer, E. J., and Dijksterhuis, H. P.
Enkele aspecten van de schurftbestrijding bij appel en peer. **(Some aspects of scab control on apple and pear.)**
Fruitteelt, 1954, **44**: 123-5, illus.

Results of trials in Holland from 1951 to 1953 have shown that the organic mercury preparation Aaventa, at 0·1%, gave excellent control of scab if applied within 96 hours of the beginning of the ascospore infection period. Nirit (dinitrorhodanebenzene) was only effective if applied within 26 hours, but could be useful on varieties which were scorched by the mercury spray. Other fungicides were less effective. Organic mercury also gave the best control of scab when leaf lesions were already present.

1342. Mujica R., F.
Combinación de fungicidas erradicantes y protectores para el control de la sarna o *Venturia* del manzano. **(A combination of eradicant and protectant fungicides for apple scab control.)** [English summary ¾ p.]
Agric. téc. Chile, 1953, **13**: 32-9, bibl. 9.

Scab is one of the most serious apple diseases in Chile, especially in the south where, owing to the sandiness of

the soil, winter cultivation is undesirable and unburied leaves consequently form an abundant source of spring infection. The effect of combined eradicant (soil) and protectant (foliage) fungicidal treatment was studied on the very susceptible Yellow Newtown variety. 0·5% elgetol was applied to the soil at 3,500 l. per ha. at the "green tip" stage (end September). The foliage sprays—0·25% basi-cup, 0·2% cuproxen (50% copper), 0·2% fermate and lime-sulphur—were applied at growth flush, petal fall and post-blossom at 15, 20 and 25 l. per tree respectively. Both the eradicant and the protective treatments were efficacious. Basi-cup, cuproxen and fermate were significantly better than lime-sulphur but were not significantly different from one another. The fruit infection rates for soil treatment alone, combined treatment (with the more effective fungicides) and the control were 9·41, 1·98–2·73, and 43·75% respectively.

1343. TEN HOUTEN, J. G.
Stambasisrot van appels, veroorzaakt door *Phytophthora cactorum* (Leb et Cohn) Schroet. **(Basal stem rot of apples caused by *Phytophthora cactorum*.)**
Fruitteelt, 1954, **44**: 14-17, illus.

A bark rot of apples has occurred on an epidemic scale in Holland in recent years. Varieties differ in their susceptibility, Cox being most severely affected. The rootstock is not affected. The symptoms are described. Investigations have shown that the disease is caused by *Phytophthora cactorum*. Little work has been done on its control in Holland, but on the basis of work in other countries the author recommends clean cultivation around the trees, cutting out the infected areas and spraying or painting the stems with bordeaux mixture.

1344. BUSSCHOTS, A.
Pourriture de l'écorce due à *Phytophthora cactorum*. **(Phytophthora bark rot (of apple).)**
Fruit belge, 1954, **22**: 3.

Brief notes are given on the affected tissues, varieties (Cox and Ellison's Orange), and rootstocks (chiefly Malling IX and IV but also XIII and XI), and on the biology of the pathogen, a wound parasite living in the soil. When a case of infection is observed the ground cover should be removed, and the diseased parts should be cut out, a thin layer of apparently healthy bark around the wound also being removed, and a protective dressing applied. Healthy stems should be treated with a copper fungicide or DNC.

1345. MCINTOSH, D. L., AND MELLOR, F. C.
Crown rot of fruit trees in British Columbia. II. Rootstock and scion resistance trials of apple, pear, and stone fruits.
Canad. J. agric. Res., 1953, **33**: 615-19, bibl. 2, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa* **1273.**

The first paper in this series reported the resistance of 40 different apple varieties and rootstocks to *Phytophthora cactorum* [see *H.A.*, 15: 96]. The present paper gives the results of further trials in which apple, plum, apricot, peach and cherry rootstocks, and pear rootstocks and scions were inoculated with a mixed culture of 4 isolates of the fungus obtained from apple. Disease ratings were calculated by a method which indicated maximum susceptibility by 100 and maximum resistance by 0. The ratings obtained are as follows: apple 0–40, pear 1–85, plum 3, apricot 19, peach 28–29, cherry 3–62. When a fifth isolate obtained from sweet cherry was added to the inoculum, and Mazzard cherry F–12–1 clonal stocks and *Pyrus robusta* seedlings were reinoculated, their disease ratings rose from 27 to 53 and from 18 to 67, respectively.

1346. ALLAN, H. R.
Black spot of Josephine pears.
J. Dep. Agric. S. Aust., 1953, **57**: 72, illus.

Black spot of Josephine pears cannot be treated by normal methods as the variety is subject to russeting. In trials in 1951 and 1952, a series of 3 applications of 0·2% TMTD at white bud, at petal fall and 3 weeks later effectively controlled black spot (2–5% infection compared with 25–30% in the controls) without causing russeting.

1347. OGAWA, J. M.
Pathogenicity comparisons between *Sclerotinia laxa* and *S. fructicola*.
From abstr. in *Phytopathology*, 1953, **43**: 589.

No sharp distinctions were found between the 2 organisms in their ability to cause blight in apple and several varieties of almond, apricot, plum, peach, and cherry. In general, *S. fructicola* was more active than *S. laxa* in inducing blossom blight; this was especially marked in peaches. Prior to petal opening, peach and almond were less susceptible to blight than after opening, whereas with plum, apricot and cherry there was no difference. The largest cankers were produced by inoculation in the spring and the smallest in the summer.

1348. FISCHER, R.
Über *Cylindrosporium*-Krankheiten an Prunusarten und deren Vorkommen in Österreich. **(On *Cylindrosporium* diseases of *Prunus* spp. and their incidence in Austria.)**
[English summary 10 lines.]
PflSch. Ber. Wien, 1953, **11**: 113-18, bibl. 18.

A first incidence in Austria of *Cylindrosporium padi* on sweet cherries is reported. The disease did not spread to an adjacent plum and zwetsche orchard. In another place zwetsche was found to be infected by the fungus, though probably by a different race.

1349. SCHMIDT, H.
Zur Bekämpfung von *Venturia cerasi* Ad. (*Fusicladium cerasi* Rabh.). **(The control of *Venturia cerasi*.)**
NachrBl. dtsch. PflSchDienst, Berlin, 1953, **7**: 211.

In the Berlin area scab of sour cherries has established itself as an important disease. In small-scale trials, carried out for 2 years, one pre-blossom spray of 1% selinon+2% cupral applied immediately before bud burst and one treatment with a copper-free fuklasin F at 1% applied 20 days after the beginning of blossoming gave very good control.

1350. GEELEN, T. E. J. M.
Nogmaals: de roestziekte van de zwarte bes. **(Further experiments on black currant rust.)**
Fruitteelt, 1954, **44**: 128-9.

Further trials on the control of black currant rust

(*Cronartium ribicola*) in Holland confirm the results of earlier experiments [see *H.A.*, 22: 2351] that copper oxychloride gives better control than either zinc carbamate or iron carbamate. One application of 0·5% copper oxychloride after flowering and another of 0·4% after harvest is recommended. It is possible that the carbamates might give satisfactory control if more applications were made, but this would only be economic where currants are grown as an intercrop in orchards where carbamates are used in the spray programme.

1351. Dementjeva, M. I.
Resistance of gooseberries to a group of diseases. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (6): 32-4, illus.

On plots of the Moscow Agricultural Academy it was observed that some gooseberry varieties are resistant to a number of diseases while others are susceptible to the same group of diseases. Varieties including Mičurinskiĭ Černyí Negus, Hauton, Karri, Pjatiletka and Mysovskiĭ 17 and 37, resistant to *Sphaerotheca mors uvae*, *Botrytis cinerea*, *Gloeosporium ribis* and *Puccinia ribesii*, were also resistant to a non-infectious withering of shoots and necrosis of leaves caused primarily by unfavourable weather in early spring.

1352. McKeen, W. E.
Loganberry rootrot on Vancouver Island.
From abstr. in *Phytopathology*, 1953, **43**: 588.
Loganberry decline on Vancouver Island.
Plant Dis. Reptr, 1953, **37**: 365-6, illus.

The symptoms are given of a Loganberry rootrot prevalent on Vancouver Island in recent years. In diseased roots examined *Phytophthora* sp. was always present, *Pythium* sp. sometimes and *Paratylenchus* sp. occasionally.

1353. Wooley, P. H.
Attempts to control red stele of strawberry with soil fungicides.
From abstr. in *Phytopathology*, 1953, **43**: 590.

Strawberry red stele disease (*Phytophthora fragariae*) has become a major problem in parts of Oregon. In preliminary control experiments DD, nabam, CBP and hexachlorocyclopentadiene were found ineffective.

1354. Deutschmann, F.
Eine Wurzelfäule an Erdbeeren, hervorgerufen durch *Phytophthora cactorum* (Leb. et Cohn) Schroet. **(A root rot of strawberry caused by *Phytophthora cactorum*.)**
NachrBl. dtsch. PflSchDienst., Braunschweig, 1954, **6**: 7-9, bibl. 8, illus.

A root rot of the strawberry variety Ydun, first recorded in the Hamburg area in the summer of 1952, was diagnosed as a leathery rot caused by *Phytophthora cactorum*. The symptoms of the disease are described and illustrated. In inoculation experiments Ydun was found to be very susceptible to infection by the fungus. —Staatsinst. f. angew. Bot., Hamburg.

1355. English, H.
Surface mold and decay of Kadota figs.
From abstr. in *Phytopathology*, 1953, **43**: 586.

One of the important factors limiting the production of Kadota figs in California is the development of surface mould and decay of the fruit during the latter part of the harvest season. The surface mould, which appears as smudgy areas, is due largely to one or more species of *Cladosporium* and *Alternaria*, whereas the shallow surface rot is caused almost entirely by *Alternaria*. In an attempt to control these disorders, fungicidal sprays were applied early in September, when a trace of surface mould was present, and 2 weeks later when the mould was more pronounced. Two applications were better than one, and the late spray was more effective than the early one. Where 2 applications of manzate, ziram, zineb, zinc coposil, and vancide 51 plus zinc sulphate were applied the disorders were reduced by approximately 50%. Captan and phygon were somewhat less effective, and crag 341 was little better than the control. Manzate, phygon XL, and crag 341 were somewhat phytotoxic.

1356. Stalder, L.
Witterung und Traubenfäulnis. **(Weather and grey mould of vine.)**
Schweiz. Z. Obst- u. Weinb., 1953, **62**: 477-84, bibl. 5.

Observations show that rain water permeates the skin of vine berries and causes them to burst. Thus rain, in addition to favouring development of *Botrytis cinerea*, increases susceptibility to the fungus. Tables indicate the relationship between incidence of grey mould and distribution of rainfall in the growing season.

1357. Branas, J.
Le mildiou. **(Downy mildew of vine.)**
Bull. Off. int. Vin, 1953, **26** (273): 59-98.*

The topics discussed are symptoms, the pathogen, conditions favourable to attack, and control (copper and non-copper fungicides, methods of treatment, and apparatus).

1358. Kundert, J.
Die Peronospora der Rebe und ihre Bekämpfung im Jahre 1953. **(Downy mildew of vine and its control in 1953.)**
Schweiz. Z. Obst- u. Weinb., 1954, **63**: 47-53, bibl. 1.

Organic copper and copper-sulphur fungicides were again tested, in comparison with bordeaux mixture, for their action against *Plasmopora viticola* [*H.A.*, 22: 2368 and 23: 1685]. They proved, on the whole, satisfactory for downy mildew control of vine, but were found to have undesirable subsidiary effects, such as favouring the development of powdery mildew and *Botrytis* rot and of promoting the formation of vinegar. Growers are therefore advised to use bordeaux mixture for their last one or two applications.—Wädenswil.

1359. Lafon, J., and Couillaud, P.
Essais de fongicides organiques dans la lutte contre le mildiou de la vigne. **(Experiments with organic fungicides for the control of vine downy mildew.)**
C.R. Acad. Agric. Fr., 1953, **39**: 744-7.

In tests at the Station Viticole, Cognac, in 1953, LO 738 (containing 75% sulphuretted polyamine) at

* Being General Report read at the 7th International Vine and Wine Congresss, Rome.

0·5% had a lower immediate and residual effect than 2% bordeaux mixture, the number of mildewed leaves per vine on 28 July being 17 and 11·7 respectively and the weight of leaves remaining per 20 vines on 5 November being 11·5 and 16·9 kg. respectively. Four mixtures of dithane with different copper fungicides were tested; in each case the dithane had a synergistic effect and the residual effect was prolonged.

1360. Ciccarone, A., Emiliani, G., and Sibilia, C.
Terza relazione su prove di lotta antiperonosporica con prodotti organici. (**Third report on the control of downy mildew with organic products.**) [English summary 16 lines.]
Boll. Staz. Pat. veg. Roma, 1952 [issued 1953], **10**: 149-54, bibl. 7.

Nine non-copper and low-copper fungicides were applied 6 times between 5 May and 2 July inclusive in tests conducted in 1952. The disease did not make its appearance till mid-September when severe defoliation began in the non-copper plots due to insufficient residual effect.

1361. Saponaro, A.
Prove di trattamenti estintivi contro la peronospora della vite. (**Trials of eradicant treatment of vine downy mildew.**) [English summary 6 lines.]
Boll. Staz. Pat. veg. Roma, 1952 [issued 1953], **10**: 189-95, bibl. 8.

An investigation was conducted in 1952 to ascertain the effect of winter destruction of vine leaves on the appearance of primary infections of downy mildew. 1% ibertox (dinitrobutylphenol triethanolamine) was applied to the soil at 2 l. per sq. m. in mid-April (before bud burst as the product is caustic), the experimental area consisting of 8 rows of 24 vines with a 5-plant control row 30 m. distant from the nearest treated row, row 1. First infection was observed early in June and the number of infected leaves was then 30 in the control row, 10 in row 1, 1 in row 2, and none in rows 3–8.

1362. Sibilia, C.
L'oidium. (**Powdery mildew of the vine.**)
Bull. Off. int. Vin, 1953, **26** (273): 99-111.*

The topics discussed are the biology of the pathogen, conditions favourable to attack, varietal resistance, extent of damage, control, and apparatus.

1363. Luttrell, E. S., and Murphy, M. M.
Effect of spraying on incidence of diseases and yields of muscadine grapes.
Phytopathology, 1953, **43**: 629-33, bibl. 7.

Although black rot (*Guignardia bidwellii* f. *muscadinii*) and angular leaf spot (*Mycosphaerella angulata*) attack the foliage of muscadine grapes, they apparently have little direct effect on yields. The most important diseases are berry rots, of which bitter rot is the most serious. Shelling of berries on the Hunt [variety] varied from 20 to 31%. Losses due to bitter rot (*Melanconium fuligineum*) varied from 13 to 26%. Combined losses due to all other berry diseases and to curculio (*Craponius inaequalis*) did not exceed 3%. In tests with an 8–8–100 bordeaux mixture on vines of the Hunt variety the most effective spray schedule was 3 sprays applied to the berries at 2-week intervals beginning soon after the berries were set. This treatment halved the amount of shedding and bitter rot and produced over a 5-year period an average annual increase in yield of 20%. Differences between sprayed and control vines are, however, not considered sufficient to justify a recommendation of spraying for the control of muscadine grape diseases. [From authors' summary.]

* Being General Report read at the 7th International Vine and Wine Congress, Rome.

1364. Bazzigher, G.
Beitrag zur Kenntnis der *Endothia parasitica* (Murr.) And., dem Erreger des Kastaniensterbens. (**A contribution to the knowledge of chestnut blight.**)
Phytopath. Z., 1953, **21**: 105-32, bibl. 19, illus.

Points elucidated in this study of *Endothia parasitica* include: (1) Bruising injuries to the tree penetrating to the cambium and the interior zones of the bark, such as hail or other mechanical wounds, constitute the most favourable condition for infection. (2) There are seasonal variations in the susceptibility of chestnuts to inoculation, the peak of the curve being in spring immediately after leafing out. The hottest months, on the other hand, are most conducive to the growth and proliferation of the fungus under the bark. (3) No relationship exists between size of lesion and host response. (4) The formation and action of a toxin, isolated from *Endothia parasitica* cultures and provisionally named diaporthin, is discussed in some detail. At present the only hope of checking the spread of this fatal blight in Europe appears to lie in the breeding of resistant varieties.—Eidg. Tech. Hochschule, Zürich.

1365. Marchionatto, J. B.
"*Phytophthora cinnamomi*" sobre castaño en la Argentina. (***Phytophthora cinnamomi* on chestnut in Argentina.**)
Rev. argent. Agron. B. Aires, 1953, **20**: 4-6, bibl. 6, illus.

Phytophthora cinnamomi was recorded on *Castanea sativa* for the first time in Argentina in 1952.

1366. Ribaldi, M.
Maculatura fogliare del nocciolo spontaneo causata da *Cylindrothyrium coryli* (*Leptothyrium coryli* Fuck.) n. comb. con osservazioni biologiche e sistematiche sul fongo. (**A leaf spot of wild hazel caused by *Leptothyrium coryli* n. comb., with biological and taxonomic notes on the fungus.**) [English summary ¾ p.]
Ann. Sper. agrar., 1953, **7**: 1941-56, bibl. 14, illus.

A leaf spot on wild hazel due to *Leptothyrium coryli* n. comb. was observed for the first time in Italy near Turin in 1950. Notes are given on symptoms and predisposing environmental factors.—Osserv. Fitopat., Perugia.

1367. Kouyeas, V.
The foot rot of pistachio tree (*Pistacia vera* L.)
Ann. Inst. phytopath. Benaki, 1952, **6**: 81-7, bibl. 8, illus.

Notes are given on a *Phytophthora parasitica* foot rot of pistachio observed near Athens in 1951. Pistachio

is a new host for this fungus. *P. terebinthus* (=*P. palaestina*), the usual rootstock for *P. vera* in Greece, is immune. Infection does not occur in summer. Recommendations for control are made.

Nematodes.

(*See also* 1295f, 1376, 1435m, 1445, 1519.)

1368. Colbran, R. C.
Problems in tree placement. 1. The root-lesion nematode *Pratylenchus coffeae* Zimmerman as a factor in the growth of replant trees in apple orchards.
Aust. J agric. Res., 1953, **4**: 384-9, bibl. 3, illus.

Pratylenchus coffeae is widely distributed in apple orchards in the Stanthorpe district and appears to be the most important factor in the unthrifty growth of replant trees. No apple stocks available in the district are immune. Apple seedlings grown in infested soil were stunted when compared with seedlings grown in the same soil after pre-treatment with D-D or formalin. Fumigation of heavily infested soil before replanting offers a partial solution to the problem. [From author's summary.]

1369. Klinkenberg, C. H.
Zwart wortelrot van aardbeien. (**Black root rot of strawberries.**)
From abstr. in *Tijdschr. PlZiekt.*, 1953, **59**: 261-2.

Recent observations suggest that root nematodes play a critical part in the development of black root rot of strawberries. Nematodes (*Pratylenchus*) are always found in the bark layer of lightly infected roots but seldom in severely infected tissue. They are very mobile and soon leave diseased roots to attack young, healthy ones. Many fungi have been isolated from infected roots but these have not produced black root rot symptoms in infection trials. Nematodes, however, isolated from soil of heavily infected fields, did produce root rot symptoms. In control experiments very good results have been obtained from soil sterilization with formalin, DD and chloropicrin.

1370. Ministry of Agriculture, London.
Eelworms on strawberries.
Adv. Leafl. Minist. Agric. Lond. **414**, 1953, pp. 7, illus.

The life histories of, and symptoms caused on strawberries by, the bud eelworms, *Aphelenchoides fragariae* and *A. ritzema-bosi*, and by the stem and bulb eelworm, *Ditylenchus dipsaci*, are described, and some alternative host plants indicated. Control measures recommended include rotation with non-infested crops, roguing, avoiding oat straw for bedding, and, pending further investigations, treatment of runners in water at 115° F. for 7 to 10 min. followed by plunging into cold water.

Mites.

(*See also* 1376, 1421, 1429, 1435e.)

1371. Pierce, W. C.
Studies of mites and their control on pecan in Louisiana.
J. econ. Ent., 1953, **46**: 561-5, bibl. 1.

Aeroplane applications of concentrated sprays of parathion against *Tetranychus hicoriae* appeared promising. Parathion plus sulphur gave good control of *T. hicoriae*, two species of *Brevipalpus* mites and the black pecan aphid, and was also effective when used in sprays containing other fungicide-insecticide combinations.

1372. Huffman, J. W., and Reynolds, H. T.
Cyclamen mite on strawberries.
Calif. Agric., 1953, **7** (12): 6-7, illus.

Experiments are reported on the control of the cyclamen mite, *Tarsonemus pallidus*, on Lassen strawberries, by fumigation with methyl bromide at 1 to 2½ lb. liquid per 1,000 sq. ft. of strawberry bed, using polyethylene plastic tarpaulins to seal the beds for 2 hours. Results indicate that methyl bromide drastically reduced mite populations and also caused a marked growth stimulation that was independent of mite control. The need for further investigation is indicated, however, by severe damage to plants occurring when temperatures became too high during fumigation and by poor control when temperatures remained too low, and by reports from other areas that strawberry varieties vary in their susceptibility to methyl bromide injury.

1373. Tunblad, B.
Viktiga gallkvalster på fruktträd. (**The more important gall mites of fruit trees [in Sweden].**)
Växtskyddsnotiser, 1953, No. 5/6, pp. 93-4.

The following are the more important gall mite species in Sweden: *Eriophyes pyri* on pear and *E. similis* and *Phyllocoptes fokeui* on plum. The symptoms they cause and their control are briefly discussed.

1374. Turnbull, J.
Effects of sprays on red spider and predators.
Grower, 1954, **41**: 232-3.

Data obtained from Kent apple growers are presented, correlating the 1952 and 1953 orchard spray programmes with the degree of red spider attack in 1953. The results are discussed.

Insects.

(*See also* 1068, 1257, 1435b, i, j, k, o, q, 1736, 2082.)

1375. Follwell, J. H.
Stored product insects and their control in British Columbia.
Ent. Circ. B.C. Dep. Agric. **1**, 1953, pp. 30, illus.

Notes are given on the chemical control of some 25 pests, some of which are of horticultural interest.

1376. Brown, E. B.
Pest control in the U.S.A.
Publ. N.A.A.S., 1954, pp. 22.

Observations are recorded which were made during a two-month visit under what is now the Foreign Operations Administration in collaboration with the U.S. Department of Agriculture and the Land Grant Colleges at Lafayette, Indiana and Auburn, Alabama. The observations, which are of a practical nature, cover the present position with regard to codling moth, fruit and preventive treatment against it and against aphides, rodent pests, pests of vegetables and of ornamentals prevalent in the districts visited. Action against general feeders such as wireworms, cutworms, armyworms,

grasshoppers and slugs is noted. Red spider (*Tetranychus telarius*) is thought to be the worst glasshouse pest and preventive treatment against it and against aphis, thrips, etc., is recorded. Notes are given on insect traps and their use, on pollinating insects, on new insecticides and acaricides, on residue problems, on development of resistance to insecticides, on breeding to obtain resistance. Short sections concern nematodes, disease and weed control, advisory work and plant and insect quarantine.

1377. Newton, J. H., Palmer, M. A., and List, G. M.
Fall migration of aphids with special reference to the green peach aphid.
J. econ. Ent., 1953, **46**: 667-70, bibl. 7.

In Colorado during a 2-years' study of virus vectors of stone fruits the green peach aphid, *Myzus persicae*, was the only species that successfully colonized and produced eggs on peach. Summer and winter host plant records are given for 13 of the most frequently trapped aphid species.

1378. Pieri, G.
La lotta antifillosserica con l'insetticida sistemico "Pestox 66". **(Control of phylloxera with the systemic insecticide Pestox 66.)** [English summary 13 lines.]
Ann. Sper. agrar., 1954, **8**: 229-38, bibl. 6.

Neither soil injections nor foliage sprays of Pestox 66 at 0·1–0·2% were effective against phylloxera on the American rootstock variety Rupestris du Lot and the European Raboso Piave in tests made at Treviso in 1952. Failure was believed to be due to the low concentrations used, the age of the vines (20–40 yr.), the difficulty of reaching the roots and the fact that part of the treatment was given rather late.

1379. Herfs, A.
The sawlike hard-wood boring lymexylonid beetle *Hylocoetus dermestoides* L. as a secondary pest on the sweet cherry tree.
Höfchen Briefe (English Ed.), 1953, **6**: 173-8, bibl. 7, illus.

The biology of *Hylocoetus dermestoides* is discussed; its larvae and the galleries they bore in cherry wood are illustrated. The beetle is considered to be a secondary pest, as the tree studied appeared to be weakened by vole damage to the roots. Mycelium of the ambrosia fungus, *Endomyces hylocoeti*, which is associated with the larvae, is seen in the photographs spreading under the bark.

1380. Kloft, W.
Auffälliger Schadfrass von *Cetonia aurata* L. an reifen Kirschen. **(Feeding injury to ripe cherries by *Cetonia aurata*.)**
NachrBl. dtsch. PflSchDienst., Braunschweig, 1953, **5**: 184, illus.

Injuries to cherry fruits, especially of very sweet varieties, by the chafer *Cetonia aurata* caused noticeable losses to growers in the Würzburg area.

1381. Andison, H.
Control of root weevils in British Columbia.
Processed Publ. Canada Dep. Agric. Div. Ent. **78,** revised 1953, pp. 8, illus.

The insects in question are the strawberry root weevil (*Brachyrhinus ovatus*), the black vine weevil (*B. sulcatus*) rough strawberry root weevil (*B. rugosostriatus*), and the clay-coloured weevil (*B. singularis*). The crops attacked are strawberries, raspberries, loganberries, blueberries, grapes, and ornamentals, including primula. Control is by setting out new plantings as far as possible from old ones, crop rotation, poison bait (for the strawberry weevils), and (for all 4 species) dusting and spraying with aldrin or chlordane of soil and plant material before planting and of plants after planting.

1382. Oines, A.
Possibilities of controlling strawberry root weevil by the use of chlordane in plant food.
Proc. joint Mtg Mich. St. hort. Soc. and Amer. pomol. Soc. 1952, 1953, pp. 73-4.

It is suggested that chlordane (8–10 lb. active substance per acre) for the control of strawberry root weevil should be added to a complete fertilizer and the mixture be broadcast over the entire field on a dry day immediately after harvesting. The bed should then be mown and the soil between the rows cultivated by a rototiller or similar implement. As a result of these operations the insecticide will act both near the crowns and in the soil.

1383. van Leeuwen, E. R.
Tests of insecticides for control of chestnut weevil larvae in the soil.
J. econ. Ent., 1953, **46**: 684-5.

Toxaphene, BHC, chlordane and parathion applied to the soil surface and disced in to a depth of 5 in. were not effective against larvae of the 2 chestnut weevils, *Curculio auriger* and *C. proboscideus*. In both laboratory and field trials fumigation with ethylene dibromide gave very good control of the larvae without damaging the chestnut trees.

1384. Myburgh, A. C.
The development of new measures for fruit fly control.
Decid. Fruit Gr, 1953, **3** (11): 7, 10.

Bait-sprays. Parathion is the most effective of the new synthetic organic insecticides as it gives a complete kill in a few hours. The recommended formula is 1 oz. 15% parathion wettable powder and 3 lb. sugar in 4 gal. water. The residual effect is lost within a week in warm weather. *Cover-sprays* are replacing bait-sprays in the fruiting season, though the latter remain important for off-season use; they act as stomach poisons as well as contact poisons. The most effective are dieldrin, methoxychlor and DDT whose effects last for more than 2 weeks, followed by malathon (10 days) and parathion (7 days). It has been established in the case of DDT cover-sprays that no residue is left in canned products. *Sterilization of export fruit*. The current method is low temperature sterilization in transit. Fumigation with EDB holds out promise.

1385. Boselli, F.
Risultati degli esperimenti di lotta contro la *Ceratitis capitata* Wied. in Sardegna, nel 1952. **(The results of experiments on the control of *Ceratitis capitata* in Sardinia in 1952.)** [English summary 14 lines.]
Ann. Sper. agrar., 1954, **8**: 239-70.

80–100% control of very heavy infestations of *Ceratitis*

capitata was obtained on Elberta and Hale peach varieties maturing in July and August, the period of highest incidence, by spraying 6 times at 10-day intervals in June/August with 50% DDT wettable powder at 1·0%, or 15–20% parathion at 0·1% or a mixture of 30% DDT emulsion at 1·0% and parathion as above.

1386. Turica, A.
Ciclo biológico de *Ceratitis capitata* Wied. en el Delta del Paraná. **(Biological cycle of *Ceratitis capitata* in the Paraná delta.)**
Idia, 1953, No. 63, pp. 1-3, bibl. 1, illus.

Ceratitis is more abundant on estates where both pome and stone fruits and citrus are grown than on those on which either the first 2 or citrus are grown alone; a mixture favours the pest, of which the first generation is passed on pome and stone fruits and the second and third on the citrus. Orchards of early peach and apple unmixed with citrus are virtually free from attack. Though eggs are laid on the more acid apples such as Granny Smith and Newtown Pippin, the larvae fail to develop. The most susceptible apple varieties are Rome Beauty, Delicious, Glengly Red, and King David. Recommended control measures are: (1) avoid mixing citrus with pome (except acid apples) and stone fruits; (2) harvest citrus before December; (3) cultivate early varieties of apple and peach for preference; (4) treatment of citrus should begin in mid-February and continue until the end of April or mid-May or until mean daily temperatures fall below 13° C.; (5) treatment of apple and peach should begin in the second half of December and continue till harvest.

1387. N.S.W. Department of Agriculture, Entomological Branch.
Fruit flies.
Agric. Gaz. N.S.W., 1953, **64**: 550-2, illus.

Notes are given on *Dacus tryoni*, early infestations of which mainly occur on loquat. Control measures are compulsory. Formulae are given for a sodium fluosilicate and a tartar emetic foliage poison bait for general use and a nicotine sulphate/DDT bait for home garden use.

1388. Hutson, R.
Apple maggot and its control.
Proc. joint Mtg Mich. St. hort. Soc. and Amer. pomol. Soc. 1952, 1953, pp. 45-8.

Good coverage and correct timing of lead arsenate or DDT sprays will achieve complete control of *Rhagoletis pomonella*.

1389. Madsen, H. F., and others.
Leaf miner on deciduous fruits.
Calif. Agric., 1953, **7** (11): 4-5, illus.

An insect, tentatively identified as the spotted tentiform leaf miner, *Lithocolletis crataegella*, has recently caused damage, in some cases severe, to foliage of pears, apples and cherries in northern California. The life history of the moth is outlined. Spraying trials suggest that the pest can be readily controlled by such insecticides as parathion, nicotine and dieldrin but that the timing of treatments is of paramount importance. The effect of existing spray programmes on 3 of its parasites is being investigated. [See also *H.A.*, 24: 372g.]

1390. Goguadze, M. N.
***Antispila rivillei*—a pest of vines in Georgia.** [Russian.]
Vinodelie i Vinogradarstvo, 1953, No. 8, pp. 45-6, illus.

The biology of a leaf miner, *Antispila rivillei*, and the damage done by it to vines are briefly described. For control, spray applications of 0·5% nicotine sulphate are recommended; in the winter old, peeling bark should be removed from the stems of vines.

1391. Geier, P.
Recherches sur le carpocapse en 1953. **(Codling moth research in 1953.)**
Rev. romande Agric. Vitic., 1953, **9**: 98-9, bibl. 3.

Earlier work at Lausanne [*H.A.*, 23: 2897] had shown that codling moth control in apples and pears in the area of Geneva depends on timing rather than on choice of insecticide. In experiments conducted in 1953 it was found that trapping is a suitable indicator of moth emergence and that light traps give more reliable results than baits.

1392. Soenen, A., and van Wetswinkel, G.
Experiments on the control of the codling moth (*Laspeyresia pomonella* L.) carried out in 1952.
Höfchen Briefe (English Ed.), 1953, **6**: 142-57.

Among other findings discussed the authors confirmed their earlier results that phosphoric acid esters will kill codling moth larvae even when the larvae have been in the apples for 3 weeks. This should make it possible, under Belgian conditions, to postpone the first application until the end of June, with a second treatment 3–4 weeks later. The dates of later sprays should be fixed in accordance with monthly flight curves.—Centre de Recherches de Gorsem, St. Trond.

1393. Rothlin, R. E.
El control de *Carpocapsa pomonella* L. **(Control of codling moth.)**
Idia, 1953, No. 70, pp. 19-21, bibl. 7.

An account is given of an experiment in codling moth control on Williams' pears carried out at the Juan J. Gómez Experimental Station in 1952/53. Five treatments were given between 24 October and 8 January inclusive at 25–28 l. per tree. The percentages of damaged fruit were 0·75 and 0·90% with 0·03 and 0·04% sprays of the ester of nitrophenyldialcoxythiophosphoric acid (46·6%), 0·25 and 0·12% with 0·25 and 0·35% sprays of 50% DDT, and 1·97 and 2·51% with 0·35 and 0·40% sprays of lead arsenate, compared with 19 and 24% in the controls.

1394. Vogel, W., and others.
Artikelserie über Biologie und Bekämpfung von Kirschblütenmotte (*Argyresthia ephippella* Fabr.) und Frostspanner (*Cheimatobia brumata* L.). **(A series of articles on biology and control of the cherry fruit moth and the winter moth.)**
Schweiz. Z. Obst- u. Weinb., 1953, **62**: 441-8, 457-63, 484-8, 495-501; 1954, **63**: 3-7, 29-36, bibls, illus.

In the spring of 1952 cherry orchards in the Frick valley, Switzerland, were severely damaged by cater-

pillar pests of several species. In the following spring the problem was studied by a group of workers, who summarized their observations and experimental results in a series of articles reprinted from the journal as a pamphlet:
Vogel, W. The biology of the cherry fruit moth (*Argyresthia ephippella*) 1953, **62**: 442-8, bibl. 2, illus.
Weber, P. Lepidopterous pests of apple and cherry collected in spring 1953, **62**: 457-62, illus.
Delucchi, V. Parasites of caterpillars of the winter moth in spring 1953, **62**: 462-3, illus.
Siegrist, H. Trials with winter washes in the Frick valley, **62**: 484-8, illus. Control of winter moth achieved with a fruit tree carbolineum was 88·5%, as compared with an experimental DNC preparation, 81·9% and parathion, applied as a pre-blossom spray, 79·0%. The kill of cherry fruit moth obtained with another DNC preparation was 96·5% and with parathion 81·7%.
Hofer, H. Winter washes in the Frick valley in 1953, **62**: 495-7. Applications of several proprietary chemicals gave very satisfactory control of winter moth and cherry fruit moth.
Häfliger, E. The substitution of winter washes in the cherry orchard, **62**: 497-501, bibl. 4. In large-scale trials, DDT, parathion and diazinon preparations, applied at the beginning of bud swelling, gave excellent results against cherry fruit moth. Against winter moth DDT proved less satisfactory, though it was superior to winter washes.
Vogel, W. Modern insecticides for the control of the cherry fruit moth, 1954, **63**: 3-7. The results of these Wädenswil trials, conducted in growers' orchards, have not been conclusive, especially in view of the difficulty of timing the treatment in plantings which comprise several varieties. Parathion appears promising, but DDT and BHC may also prove satisfactory.
Hofer, H., and Vogel, W. Observations, in spring 1953, on the necessity and efficacy of winter washes, **63**: 29-34, illus. Observations show that the cherry fruit moth can be satisfactorily controlled by winter washes if spraying is carried out with adequate thoroughness. In years of exceptional infestation spring applications may be necessary to achieve winter moth control.
Vogel, W. Looking backward and forward, **63**: 35-6. The results of all the 1953 trials are summarized in a table and suggestions are made for the control of the cherry fruit moth and some other cherry pests in 1954.

1395. Martin, D. F.
Peach tree borer control.
J. econ. Ent., 1953, **46**: 704-5, bibl. 4.
Three spray applications of lindane, DDT and dieldrin, and fumigation with paradichlorobenzene and ethylene dichloride reduced peach tree borer, *Sanninoidea exitiosa*, populations by 95% or more. Less frequent applications of the sprays or the same number of applications of other spray materials gave less effective results.—Tex. agric. Exp. Stat.

1396. Snapp, O. I.
Effect on the oriental fruit moth of materials used for plum curculio control.
J. econ. Ent., 1953, **46**: 707.
Parathion and EPN applied for plum curculio, *Conotrachelus nenuphar*, control on peaches were also effective in preventing injury by oriental fruit moth, *Grapholitha molesta*.

1397. Griemsmann, —., and Reich, H.
Von der Ampferblattwespe. (**The dock sawfly.**)
Mitt. ObstbVersuchsrings Jork, 1953, **8**: 262-4, illus.
Laxton's Superb was heavily attacked by the dock sawfly (*Ametastegia glabrata*) where oil pumpkin (*Cucurbita pepo oleifera*) was grown between the rows of young apple trees. Earlier varieties escaped infestation. Parathion is recommended for the treatment of pumpkins and late apples.

1398. Fosen, E. H., Cressman, A. W., and Armitage, H. M.
The Hall scale eradication project.
Circ. U.S. Dep. Agric. **920**, 1953, pp. 16, bibl. 13, illus.
The Hall scale (*Nilotaspis halli*) was first discovered in the United States in 1934 at Chico, California, and has been found only there and at 2 places within 100 miles. Plants infested were limited to the genera *Prunus* and *Amygdalus* and the shrub *Spiraea veitchii*. An account is given of a comprehensive eradication project organized in 1941. Trees were fumigated with 40 c.c. of liquid hydrocyanic acid per 100 cubic feet for 50 minutes in the daytime in the dormant season. The gas was introduced with a blower applicator and most of it was evacuated with a large blower before the tents were removed. Tents made of plastic-covered cloth were transferred from tree to tree with especially designed pullers. The treatment programme consisted of three annual fumigations after the last live scale had been seen, supplemented by spring and summer oil sprays. By the spring of 1952 this programme had been completed on properties containing about 22,000 host plants. Live scales were found in only two orchards after the first fumigation, and in none after the second. After completion of the treatment programme, previously infested properties were repeatedly reinspected. [From authors' summary.]

1399. van de Pol, P. H.
Het gebruik van een mobiele gascel voor de behandeling van houtige gewassen en aardbeienplanten. (**The use of a mobile gas chamber for fumigation of woody plants and strawberries.**
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 207-9, illus., being *Meded.* **120.**
To prevent the importation into Holland of the San José scale, the HCN fumigation of certain fruit tree and woody ornamental species on entry is now compulsory. A detailed description is given of the mobile gas chamber used for this purpose and of the method of fumigation. The gas chamber can also be used for fumigating strawberry plants with methyl bromide to control strawberry mite (*Tarsonemus pallidus*).

Other pests.

1400. English, W. S.
Preventing bird damage to fruit tree buds.
Agriculture, Lond., 1953, **60**: 426-9, illus.
In trials conducted in 1952 and 1953 a number of

deterrent sprays and dusts were used but none gave any reasonable measure of protection. Black cotton and other scaring devices only acted as deterrents for short periods, although further trials are to be conducted using an American visual device. J.S.

1401. WAGENINGEN, PLANTENZIEKTENKUNDIGE DIENST.
Vogels. (**Birds.**)
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 125-38, illus., being *Meded.* **120.**
A general discussion on prevention of bird damage is followed by notes on various bird species, dealing with damage and problems and possibilities of control.

1402. MANSFELD, K., AND BÖSENBERG, K.
Ergebnisse und Erfahrungen der ersten grossräumigen Sperlingsvergiftung. (**Results of the first large-scale sparrow poisoning campaign.**)
NachrBl. dtsch. PflSchDienst, Berlin, 1953, **7**: 201-3.
During a baiting campaign, carried out with poisoned wheat in Eastern Germany in the winter of 1952/53 in an area comprising 164 parishes, over 85,000 dead sparrows were counted. Considering that only about 40% of the sparrows killed are found on such occasions the result is regarded as very satisfactory. The percentage of song birds and poultry killed was negligible.

1403. MAARSE, J.
Spreeuwenschade. (**Starling damage.**)
Fruitteelt, 1954, **44**: 157, 159, illus.
Attention is drawn to work carried out in Holland during 1938-44 on the control of starlings, which cause serious losses to fruit growers. Migratory starlings, which collect for the night in reed meadows or high trees, may be controlled by cutting the reeds in the district and by disturbing the birds in their sleeping quarters between 9 and 10 p.m. with noisy bird scarers. Of even more importance is the control of starlings which nest in roofs. This is best achieved by destroying the nests when the young are a few days old, and should be carried out systematically throughout the district. Once an area is cleared it is not likely to be reinfested.

1404. STORER, T. I.
Controlling field rodents in California.
Circ. Calif. agric. Ext. Serv. **434,** 1953, pp. 47, bibl. 6, illus.
Control of ground and tree squirrels, pocket gophers, field mice, kangaroo rats, muskrats and rabbits by poison baiting and poison gases, trapping, shooting, exclusion, and encouragement of natural enemies.

1405. JOHANSSON, E., AND KLANG, C. A.
Försök med medel till skydd av fruktträd mot harar. (**Trials with chemicals for the protection of fruit trees against hares.**)
Fruktodlaren, 1954, No. 1, pp. 8-11.
None of the proprietary paints and sprays tested at Alnarp combined effectiveness as hare and rabbit repellents with harmlessness to the fruit trees treated. Tying corrugated cardboard round the stems is the method recommended for home gardens. Plum trees were found to be as attractive to hares as apple and pear trees.

1406. WIKESJÖ, K.
Prövning av "harskyddsmedel" på Gotland. (**Tests with hare repellents in Gotland, Sweden.**)
Fruktodlaren, 1953, No. 6, pp. 152-6, illus.
In Gotland, hare and rabbit damage to fruit trees is very severe in winter. A few of the repellents experimentally applied to apple trees from 1950 to 1953 showed some promise, but fundamentally the problem remains unsolved for two reasons: (1) If the chemicals are applied in effective concentrations they are liable to injure the tree. (2) Compounds repelling hares are not so effective against rabbits and vice versa.

1407. ROBB, C. J.
Rabbit deterrent plus insecticide.
Comm. Gr, 1954, No. 3031, p. 183.
A commercial fruit grower reports that a mixture 1 lb. lime to 2 pints of tar oil, with water added to bring it to a consistency of cream, has proved an excellent deterrent against rabbits and hares when brushed on the trunks and lower branches of newly planted orchard trees. The coating will remain deterrent for 12 months and also serves as a useful insecticide.

1408. MÜNCHBERG, P.
Neue chemische Waffen und Wege in der Nagerbekämpfung. (**New rodent control methods.**)
Anz. Schädlingsk., 1953, **26**: 145-9, bibl. 5.
The merits of several new chemicals for rat and mouse control are discussed. Derivatives of 4-oxycoumarin (anticoagulants) were superior to 2 thiourea derivatives.

1409. STEINIGER, F.
Über die Wirksamkeit des "Fumarin", eines neuen Antikoagulans zur Rattenbekämpfung, und seine Verträglichkeit für Haustiere. (**On the action of Fumarin, a new anticoagulent for rat control and its toxicity to domestic animals.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1953, **5**: 167-8, bibl. 5.
Fumarin, a new German anticoagulant, the formulation of which has not yet been disclosed, was found to be more than twice as effective against rats as Warfarin. Its toxicity to domestic animals proved no greater than that of Warfarin.

1410. WAGENINGEN, PLANTENZIEKTENKUNDIGE DIENST.
Bestrijding van de woelrat, *Arvicola terrestris* L. (**Control of the black water rat.**)
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 119-20, being *Meded.* **120.**
In laboratory tests the black water rat did not show special feeding preference for the unworked apple rootstocks M.IV and M.IX. It is considered that this preference which is very noticeable in the field is due to the relative capacity of the rootstocks for storing assimilates produced by the scion. The rats appeared to show no special feeding preference among vegetables, with the result that no suitable bait can be recommended. Among ornamental trees a marked preference was shown for willow and poplar, while alder was rarely attacked. Rodent repellents appeared to have no effect on the rats. A survey has shown that a

population of about 15 water rats per ha. will not cause serious horticultural damage. The size of the population is closely related to the thickness of the vegetation on the dyke banks.

1411. N.S.W. Department of Agriculture, Entomological Branch.
Snails and slugs.
Agric. Gaz. N.S.W., 1953, **64**: 663-4, illus.
Notes are given on the control of snails and slugs in ground crops and of snails in citrus orchards where in low-lying areas young snails eat the foliage and ripe and unripe fruit. Against snails on citrus a mixture of bordeaux 2: 2: 80, 1 gal. white oil and ¾ pt nicotine sulphate is an effective contact spray with a good residual effect. The introduction into the orchard of Khaki Campbell or Indian runner ducks, 2 per acre, in late summer is recommended.

Antibiotics.

(*See also* 1333, 1555, 1742 l.)

1412. Barkley, F. A.
Plant virus studies, I-VII.
Lloydia, 1953, **16**: 132-41, bibl. 15.
Among these studies carried out in Jamaica were two in which the toxicity of some 20 antibiotics to bean seedlings were tested. Some of the substances were strongly toxic while others stimulated growth and root development. There was usually a close correlation between plumule development and root development and, conversely, between toxicity and root inhibition. Toxic substances included chloromycetin, aureomycin, furacin, terramycin, Newcastle virus and neomycin. Furadantin and biosulfa were among the stimulants. Certain of the substances seemed to exert some, but in no case complete, control of the mosaic disease of mallows.

1413. Cercós, A. P., and Rodríguez Berretta, H. T.
Acción antimicrobiana de algunas fanerógamas argentinas. (**Antimicrobial effect of some Argentinian phanerogams.**)
Idia, 1953, No. 69, pp. 1-7, bibl. 16.
Plants of many different families were tested for their antimicrobial action on *Bacillus subtilis* and *Escherichia coli*. A list is given of the active and inactive species. *Annona cherimola*, *Terminalia triflora*, *Acnistus australis* and *Vernonia nudiflora* had a very strong effect on *Bacillus subtilis*. *Prosopis nigra* var. *ragonesei* had a very strong effect on *Escherichia coli*.

Fungicides and insecticides.

(*See also* 1435d, g, p, s, 1515, 1523.)

1414. Australia Department of Health (Mertin, J. V.).
Pesticides Quarterly Supplement.
Pesticides quart. Suppl. Commonw. Aust. Dep. Health, 1953, No. 8, pp. 401-31, bibl. 54.
A review of recent literature on the effects of insecticides, fungicides, herbicides and rodenticides on man and animals.

1415. Manger, W. H.
De invloed van bestrijdingsmiddelen op tuinbouwgewassen. (**The effect of plant protective substances on the condition of horticultural crops.**) [English summary ½ p.]
Meded. Dir. Tuinb., 1954, **17**: 49-60, extensive bibl. available from Lab. TuinbPlantent., Wageningen.
An investigation on the injurious effects to the plant of copper compounds, sulphurous substances and oil sprays is reported, and factors affecting the phytotoxicity of such sprays are discussed.

1416. Zeumer, H.
Methoden zur Prüfung von Pflanzenschutzmitteln LVI. Die Bestimmung der Haftfestigkeit von Stäubemitteln. (**Methods for the testing of plant protective chemicals LVI. Estimating the adhesiveness of dusts.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1954, **6**: 17-23, bibl. 7, illus.
A method evolved for estimating the adhesiveness of dusts yielded reproducible results which were comparable under different climatic conditions, and with various compounds.—Biol. Bundesanst. Braunschweig.

1417. Byrde, R. J. W., and Woodcock, D.
Fungicidal activity and chemical constitution. II. Compounds related to 2: 3-dichloro-1: 4-naphthaquinone.
Ann. appl. Biol., 1953, **40**: 675-87, bibl. 24.
2: 3-Dichloro-1: 4-naphthahydroquinone and several derivatives were prepared and tested in aqueous acetone solution against four fungi using a spore germination technique. The hydroquinone showed the same order of fungicidal activity as 2: 3-dichloro-1: 4-naphthaquinone, but was no less phytotoxic. Whilst the dibenzoyl ester and the dimethyl ether proved virtually inactive, the diacetyl ester was found to be as effective as 2: 3-dichloro-1: 4-naphthaquinone against *Sclerotinia laxa*, *Botrytis fabae* and *Cladosporium fulvum*, and also less phytotoxic to plum fruitlets and tomato and broad bean foliage. Reduced fungicidal activity was shown when the substance was formulated as an aqueous suspension suitable for field application. The rates of alkaline hydrolysis of these esters have been determined, and a relationship between ease of hydrolysis and fungicidal activity is apparent. It is suggested that these compounds, whilst not inherently active, are similarly hydrolysed to 2: 3-dichloro-1: 4-naphthahydroquinone in the presence of a fungal esterase. [Authors' abstract.]—Long Ashton Res. Stat.

1418. Janke, A., and Kraus, H.
Über die Kombinationswirkung von Schwermetallverbindungen und oberflächenaktiven Stoffen auf Pilze. (**The effect on fungi of heavy metal compounds applied in combination with surface-active substances.**) [English summary ¾ p.]
PflSch. Ber. Wien, 1953, **11**: 97-112, bibl. 16.
The addition of a spreader (Bradosol) to copper sulphate or phenyl mercuric acetate increased the toxicity of the heavy metal salts to the spores of 3 test fungi.

1419. Wain, R. L.
Systemic fungicides.
5th int. Symp. Phytopharm., May 1953, pp. 394-401, bibl. 24, illus., being *Reprint Wye Coll.* **41** (n.s.).
In this review special reference is made to the work at Wye College on the use of growth substances as fungicides, in which broad bean and *Botrytis cinerea* or *B. fabae* were used as experimental material.

1420. Congdon, N. B.
Treatment of wounds.
Fruit and Prod., 1953, **8** (6): 10-11, 13, illus.
Following notes on the removal of tree limbs, recommendations are made for the use of acidulated mercuric chloride for disinfecting wounds left after removing diseased tissues from pome and stone fruit trees, and of bordeaux paste and Restar disinfectant fluid for the treatment of diseased areas on citrus trees. The diseases concerned in each case are listed.

1421. Massee, A. M.
Insect population balance and chemical control of pests. Insecticides in the apple orchard.
Chem. Ind. Lond., 1953, No. 39, pp. 1004-5.
Apple orchard fauna fluctuations due to spraying in the last 50 years are reviewed. The gradual elimination of important pests has not turned the balance in favour of the fruit grower; red spider is now the chief pest, and codling, tortrix, woolly aphid and other important pests persist. Improved sprays and spraying machinery have, however, reduced the number of serious pests and the stage has been reached when the grower, instead of applying comprehensive sprays, should apply the correct spray to control a particular pest when it appears. Future research should entail a study of the complete fauna, not individual species, and a quest for selective insecticides and fungicides so that sprays can be innocuous to the majority of beneficial insects and mites. [See also *H.A.*, 23: 465.]

1422. Solomon, M. E.
Insect population balance and chemical control of pests. Pest outbreaks induced by spraying.
Chem. Ind. Lond., 1953, No. 43, pp. 1143-7, bibl. 54.
A list is given of pest outbreaks in various parts of the world induced by spraying. Ecological considerations bearing on the problem of economic pest control are discussed. A diagram shows the chief inter-relationships of a population of a species with its environment.

1423. Varley, G. C.
Insect population balance and chemical control of pests. Population theory and economic entomology.
Chem. Ind. Lond., 1953, No. 47, p. 1250, bibl. 3.
The minimum requirements for a proper analysis of the interaction between parasite and host are that the population densities and reproductive rates of both parasite and host must be known over a period covering different population densities. "The plea is first for biological study to find why certain species are pests and others are not; secondly, if insecticides are used, they should be used only when the pest is present and likely to do damage; and, thirdly, that long term studies of the effects of insecticides on both parasites and hosts should be made before putting them into general use."

1424. Pickett, A. D., and Patterson, N. A.
The influence of spray programs on the fauna of apple orchards in Nova Scotia. IV. A review.
Canad. Ent., 1953, **85**: 472-8, bibl. 19.
The authors summarize the experience gained from studies on the complex interrelationships between chemical and biological control as related to the main apple pests of the Annapolis Valley, Nova Scotia, namely the oystershell scale (*Lepidosaphes ulmi*), the European red mite (*Metatetranychus ulmi*), the eye-spotted bud moth (*Spilonota ocellana*) and the codling moth (*Carpocapsa pomonella*). [See also *H.A.*, 7: 723 and 22: 401.]

1425. Dumas, —.
L'expérimentation à l'échelon agricole; facteur essentiel pour la mise au point des techniques modernes de lutte contre les ennemis des fruitiers. **(Field-scale experimentation as an essential factor in the testing of modern techniques for control of fruit tree pests.)**
Pomol. franç., 1953, **80**: 137-8.
After a plea for field-scale experimentation as a means of determining the efficacy of insecticides, an account is given of one such experiment conducted by the Plant Protection Service in 1952/53 against cherry fruit fly in the Durance valley. Two treatments were given on dates fixed by the Agricultural Warning Station at Avignon at a 15-day interval with mixtures containing 100 g. DDT [per l.?] as concentrated wettable powder or emulsion. The infestation rate was nil–1·6% compared with 13–100% in the controls, and the cost was 2 fr. per kg. of cherries harvested.

1426. Martin, H.
Factors affecting the practical employment of systemic insecticides.
Canad. Ent., 1953, **85**: 414-20, bibl. 22.
A review article. Expansion of the use of systemic insecticides awaits an assessment of the poison hazards of treated crop plants. The decomposition of schradan to non-poisonous products appears to be complete in six weeks in the actively-growing plant, while ethyl-mercaptoethyl diethyl thiophosphate, the active component of systox, disappears from the plant in about 90 days.

1427. Wahlin, B.
Bina och de systemiska insekticiderna. **(Bees and systemic insecticides.)**
Växtskyddsnotiser, 1953, No. 5/6, pp. 80-2.
Systox (0·025% and 0·05%), applied repeatedly to flax and white mustard, had no harmful effect on bees visiting the flowers.

1428. Anon.
Technical communication on chlorocide.
[*Publ.*] *Boots Pure Drug Co. Ltd.*, Nottingham, [1953], pp. 25.
Chlorocide products contain chlorparacide (*p*-chlorbenzyl *p*-chlorphenyl sulphide). The manufacturers

in introducing this new acaricide outline the results of work by their research department on the biological effects, chemistry and uses of the compound. It has shown high toxicity to the eggs and larvae of the fruit tree red spider mite, *Metatetranychus ulmi*, and the glasshouse red spider mite, *Tetranychus telarius*, systemic penetration of leaves, high persistence, limited phytotoxicity, no tainting effect and virtually no toxicity to mammals. Varieties of top fruit on which chlorocide has been tested successfully are listed and recommendations are made on dosage rates and times of application for these fruits, bush fruits and glasshouse crops [see also next abstract and *H.A.*, 24: 311].

1429. Anon.
Control of red spider mites.
Cranham, J. E., Higgons, D. J., and Stevenson, H. A.
p-Chlorbenzyl p-chlorphenyl sulphide: a new ovicide for control of red spider.
Chem. Ind. Lond., 1953, No. 40, p. 1055, illus., No. 45, pp. 1206-7, bibl. 2.

"Chlorocide" is a new product for the control of winter and summer eggs and larvae of red spider. It contains 20% chlorparacide (*p*-chlorbenzyl *p*-chlorphenyl sulphide), and is available as a miscible oil and a dispersible powder. It is not an insecticide and does not harm the predators of the red spider. It is not dangerous to spray operators, and residues are non-poisonous and confer no taint.

1430. Bachmann, F.
Diazinon, ein neuer Phosphorsäureester. **(Diazinon, a new phosphoric acid ester.)**
Schweiz. Z. Obst- u. Weinb., 1954, **63**: 36-7.

Diazinon, a phosphoric acid ester developed by a Swiss firm and marketed as Basudin, is reported to be as effective as parathion against insects and mites but to be only one-tenth as poisonous to man and other warm-blooded animals. The prospective uses of the new chemical against fruit and vine pests are briefly discussed.

1431. Hard, M. M., and Ross, E.
Pesticides and flavors; effect of malathion on flavor of certain fruits and vegetables.
J. agric. Food Chem., 1954, **2**: 20-2, bibl. 16.

Experiments conducted in Washington and Oregon indicated that the usual dosages of malathion have no effect on the flavour of beans, peas, sweet cherries, apples, peaches, pears and strawberries. J.S.

1432. Bachmann, F.
Versuche über Notwendigkeit und Wirkung der Winterspritzung an Apfelbäumen. **(Tests on the necessity for and action of winter washes applied to apple trees.)**
Schweiz. Z. Obst- u. Weinb., 1954, **63**: 53-64, bibl. 5, illus.

Tests were carried out for 4 years in 40 apple orchards in German-speaking Switzerland to study the possibility of cutting down the cost of pest control. Eggs on specified samples of twigs were counted in winter and infestation was checked again in spring after bud burst. It was found that in some seasons winter washes were superfluous in view of the small number of eggs present, while in other years the control of caterpillars was inadequate. Winter treatment, it is concluded, could be dispensed with either if the egg count is low or, in the case of heavier infestations, if synthetic insecticides can conveniently be added to pre- and post-blossom fungicidal applications.—Wädenswil.

1433. Thiem, H., and Schetters, C.
Verlauf und Erfolg einer gezielten Vorblütebehandlung im Obstbau. **(The success of a well-timed pre-blossom spray against pests of fruit trees.)**
Reprinted from *Pflanzenschutz*, 1953, **5**: 111-17, bibl. 3.

The encouraging results obtained from spraying mixed orchards infested with major pests and diseases with nirit, E605, DDT and BHC compounds suggest that accurately timed and thorough pre-blossom applications by mist blower are capable of restoring the health of neglected orchards in the absence of winter washes.

1434. Bachmann, F.
Versuche über den Ersatz der Winterspritzung. **(Experiments on substitutes for winter washes.)**
Schweiz. Z. Obst- u. Weinb., 1954, **63**: 81-6, bibl. 2.

(1) *Apple*. In 3 trials in the spring of 1953 the addition of parathion, diazinon or a parathion-lindane mixture to the second pre-blossom spray reduced the incidence of larvae of several pests by 75–100%, and in most cases by over 90%. The control obtained was superior to that normally achieved by winter washes. Aphids were also satisfactorily controlled. (2) *Zwetsche*. Diazinon sprays, which proved superior to parathion and diazinon emulsion, gave complete control of aphids and 99% control of *Eulecanium corni*, if applied before blossoming. (3) *Apple blossom weevil*. Diazinon and lindane, applied with the first pre-blossom treatment, gave satisfactory control of the apple blossom weevil; parathion was somewhat less effective. Winter washes were thus shown to be unnecessary for this pest.—Wädenswil.

Noted.

1435.

a Bömeke, H.
Warum verwachsen Kernobstfrüchte? **(Malformation in pome fruits.)**
Mitt. Obstb Versuchsrings Jork, 1953, **8**: 290-4, bibl. 2, illus.
In apples and pears.

b Börner, C.
Europae centralis Aphides. Namen, Synonyme, Wirtspflanzen, Generationstyklen. **(The aphids of Central Europe. Names, synonyms, host plants, life histories.)**
Mitt. thür. bot. Ges., Beiheft 3, Lieferung 1 and 2, 1952, pp. 488, bibl. very numerous.

c Bould, C.
Magnesium deficiency in apple trees.
Grower, 1953, **40**: 1041-4, illus.
Symptoms and control.

d CLAUSEN, R.-L.
Les traitements des vergers par pulvérisation pneumatique. Applications pratiques realisées en Suisse au cours de ces dernières années. **(Orchard treatment by concentrate spraying. Tests made in Switzerland in recent years.)**
Pomol. franç., 1953, **80**: 147-8.
A Swiss spray timetable for concentrate spraying with notes on technique.

e COLLYER, E.
Insect population balance and chemical control of pests. Predators of the fruit tree red spider mite.
Chem. Ind. Lond., 1953, No. 40, pp. 1044-6.
See also *H.A.*, 23: 2850, 2852, and 24: 310.

f DURBIN, R. D., AND SNYDER, W. C.
Ecology and hosts of flyspeck of apple [*Microthyriella rubi*] in California.
From abstr. in *Phytopathology*, 1953, **43**: 586.

g FOLCKEMER, F. B., AND LOEFFLER, E. S.
Insecticide-fertilizer combinations.
Agric. Chemls, 1954, **7** (2): 42-4, 123, bibl. 10.
A general review.

h HERTGERS, J.
Resultaten en ervaringen met schurftbestrijdingsmiddelen in Zeeland—seizoen 1953. **(Experience with fungicides for scab control in Zeeland in 1953.)**
Frnitteelt, 1954, **44**: 158-9.

i MACNAY, C. G.
Summary of important insect infestations, occurrences, and damage in Canada in 1952.
83rd A.R. ent. Soc. Ontario, 1952, pp. 66-94.
Includes insects affecting greenhouse and ornamental plants, vegetables and fruit.

j MADSEN, H. F., BORDEN, A. D., AND CLARK, R. E.
Orange tortrix on apricots.
Calif. Agric., 1953, **7** (12): 7-8.
Controlled with malath[i]on.

k MINISTRY OF AGRICULTURE, LONDON.
Apple sawfly.
Adv. Leafl. Minist. Agric. Lond. **13,** revised 1953, pp. 4, illus.

l MINISTRY OF AGRICULTURE, LONDON.
Brown rot of apples.
Adv. Leafl. Minist. Agric. Lond. **155,** amended 1953, pp. 4, illus.
Sclerotinia fructigena and its control.

m MINISTRY OF AGRICULTURE, LONDON.
Stem and bulb eelworm. Horticultural crops.
Adv. Leafl. Minist. Agric. Lond. **175,** amended 1953, pp. 6, illus.

n ROGERS, W. S.
Some aspects of spring frost damage to fruit and its control.
J. roy. hort. Soc., 1953, **79**: 29-36, bibl. 22, illus., reprinted with additions from *Rep. 13th int. hort. Congr. Lond.*, 1952 [see *H.A.*, 23: 381].

o SMIT, B.
The white peach scale.
Fmg S. Afr., 1953, **28**: 394.
Diaspis pentagona, life history and control.

p SMITH, C. F., AND CLAYTON, C. N.
Peach spray information 1953.
Spec. Circ. N.C. agric. Exp. Stat. **17,** 1953, pp. 11.

q THIEM, H.
Die Wirtspflanzen der San José-Schildlaus und ihre Bedeutung. **(Host plants of the San José scale and their significance.)**
Reprinted from *Z. angew. Ent.*, 1953, **35**: 91-122, bibl. 25, illus.

r THIEM, H.
Der Pflanzenschutz auf alten Wegen. **(Biological versus chemical plant protection.)**
Reprinted from *Anz. Schädlingsk.*, 1953, Vol. **26,** pp. 6, bibl. 13.
Chemical means still supreme.

s WEED, R. M., MCCALLAN, S. E. A., AND MILLER, L. P.
Factors associated with the fungitoxicity of ferbam and nabam.
Contr. Boyce Thompson Inst., 1953, **17**: 299-315, bibl. 21.
The test plants and fungi used included tomato, bean, *Monilinia fructicola*, *Alternaria oleracea* and *Glomerella cingulata*.

WEEDS AND WEED CONTROL.

General.

(*See also* 1241, 1376, 2089.)

1436. ROBERTSON, J. H.
Ecological principles applied to plant control.
Proc. 4th annu. Calif. Weed Conf., 1952, San Luis Obispo, pp. 28-32.
Considering such factors as migration, germination, growth, reproduction and competition.

1437. PARKS, R. R.
Weed control with tillage.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 46-9.
Machines and methods used for cut-off, drag-out and cover-up tillage are discussed.

1438. TUKEY, L. D., AND WILLIAMS, O.
Small sprayer for application of weed killers may be built in farm shop.
Science for the Farmer, 1953, **1** (2): 14-15, illus.
A description is given of the construction and operation of a sprayer consisting of a 55 gal. oil drum, a Briggs and Stratton 2–2½ h.p. petrol engine, and an Oberdorfer rotary pump, size No. 9.

Herbicides.

(*See also* 1114, 1485b.)

1439. Snyder, F. W.
Physiological effects of selected herbicides on corn, cotton, soybean and certain noxious weeds. A progress report.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 58-60.
A method of growing seedlings in nutrient solution containing various concentrations of herbicides for different periods, followed by further growth in a nutrient solution free of herbicide, is recommended for studying the physiological effects of these chemicals on plants.

1440. Crafts, A. S.
Physiology of herbicidal action.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 23-7.
A review of a number of herbicides presented in tabulated form, indicating in the case of each the nature of its action and describing the principal factors that determine the success of its use. Table 1 gives a list of 58 chemical control methods, Table 2 classifies the methods into 9 categories and Table 3 classifies herbicides first into 2 main groups of selective and non-selective weedkillers and then according to methods of application.

1441. Vlitos, A. J.
Herbicide development.
Agric. Chemls, 1954, **9** (2): 45-7, 117, 119, bibl. 18.
A discussion on the herbicidal action of aryloxy compounds, with observations on some of the hypotheses that have been advanced to explain plant growth regulation.

1442. Robinson, B. P.
Inhibition of weed seed germination in seed beds by the use of calcium cyanamide and urea.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 205-7.
The effect of various calcium cyanamide–uramon combinations on weed control, rye grass growth and chemical changes in a fine sandy loam soil in Georgia are discussed.

1443. Klatt, W. L.
Soil sterilants in present day weed control.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 122-7.
Chemicals used as either temporary or relatively permanent sterilants include the arsenicals, sodium chlorate, carbon disulphide, ammonium sulphamate, TCA, CMU and various borate compounds.

1444. Johnson, E.
Killing weed seeds in nursery and greenhouse soils with methyl bromide.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 71-4.
Soil fumigation with methyl bromide under polyethylene or vinyl plastic covers is discussed.

1445. Bennett, R. R., Nau, H. H., and Hawks, S. N., Jr.
Methyl bromide for weed and nematode control in plant beds.
Ext. Folder N.C. agric. Exp. Stat. **101**, 1953, pp. 5, illus.
A detailed description is given of the method used in applying the fumigant and of the equipment needed. Best results can be expected when the soil temperature at the time of treatment is 50° to 60° F. and the soil moisture is about right for sowing.

1446. Swingle, M. C.
Discussion of CMU at the California Weed Control Conference, January, 1952.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 69-70.
Brief notes are given on weed control and toxicity tests with CMU, and it is concluded after 2 years field trials that it can be recommended for use as a soil sterilant where complete kill of all vegetation is desired.

1447. Loustalot, A. J., Muzik, T. J., and Cruzado, H. J.
A study of the persistence of CMU in soil.
Agric. Chemls, 1953, **8** (11): 52-3, 97-9, 101, bibl. 8.
A series of experiments was conducted in the greenhouse and in the field to study the effect of environmental factors on the persistence and movement of CMU (3-para-chlorophenyl-1, 1-dimethylurea) in the soil. In general, factors favouring soil microbial action seemed also to favour the disappearance of CMU.—Fed. Exp. Stat. Puerto Rico, Mayaguez.

1448. Tocquigny, J. R., and Livingston, G. A.
The effect of CMU and alanap as pre-emergence herbicides in castor beans.
6th Proc. south. Weed. Conf. 1953, New Orleans, La, pp. 170-3, bibl. 1.
The primary weeds present in castor bean plots in Texas were species of careless weed, *Amaranthus* spp., and Johnson grass, *Sorghum halepense*. Pre-emergence applications of CMU at ½, 1, 2 and 3 lb. per acre gave excellent weed control, but the 3 higher rates damaged the castor bean plants and reduced yields. The ½ lb. per acre of CMU caused no apparent harmful effects. Alanap (formulation No. 2—imid of N-1 naphthyl phthalamic acid), due to belated applications, gave unsatisfactory weed control.

1449. Brown, W. H., and others.
Note on a physiologically active pseudourea.
Canad. J. agric. Sci., 1953, **33**: 622, bibl. 2.
The compound 3,3-di-(4-chlorophenyl)-2-methyl-pseudourea was found to have an effect similar to CMU (3-(4-chlorophenyl)-1,1-dimethylurea) in causing damage to broad-leaved weeds and in suppressing germination of radish and timothy seeds. The compound stimulated the elongation of timothy roots at concentrations below 8 p.p.m., but suppression occurred at higher concentrations. CMU produced similar effects at concentrations 4 times as strong.

1450. Loustalot, A. J., and Muzik, T. J.
The effect of 2,4-D on apparent photosynthesis and developmental morphology of velvet beans.
Bot. Gaz., 1953, **115**: 56-66, bibl. 7, illus., and abstr. in *6th Proc. south. Weed Conf.* 1953, New Orleans, La, p. 57.

There was a sharp reduction or cessation of photosynthesis in velvet bean leaves within 5 hrs of treatment with 0·1 or 0·05% 2,4-D applied as a spray or dip. The mesophyll leaf tissue was extensively damaged and destroyed and the plants died before any pronounced modifications occurred in the stem tissues. Application of 0·01% 2,4-D reduced photosynthesis within 5 hrs, but several days elapsed before CO_2 assimilation ceased and the plants died. The rate of photosynthesis of plants sprayed with 0·001% 2,4-D was not appreciably affected until a week or more after treatment. Although growth ceased, the plants were not killed and photosynthesis continued at a reduced rate for several weeks after treatment.

1451. Smith, R. J., Jr., and Ennis, W. B., Jr.
Studies on the downward movement of 2,4-D and 3-chloro-IPC in soils.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 63-71, bibl. 6.

In pot experiments in Mississippi 2,4-D leached slightly less in soils of high clay content than in less clayey soils. The polyethylene glycol butyl ether 2,4-dichlorophenoxyacetate leached downward significantly less than certain salt forms and the acid of 2,4-D. The 2,4-D acid applied in oils leached downwards to about the same degree as when applied in water. While activated carbon placed above crop seeds but below the soil surface prior to 2,4-D application increased the stand of crops, the procedure was not found economically justifiable. The compound 3-chloro IPC was less mobile in potted soil following watering than 2,4-D.

1452. Moore, D. H., and others.
Carbamate herbicides; evaluation of three carbamate herbicides in comparison with isopropyl N-(3-chlorophenyl) carbamate.
J. agric. Food Chem., 1953, **1**: 1154-8, bibl. 15.

Isopropyl N-(3-methylphenyl) carbamate (1), sec-butyl N-(3-chlorophenyl) carbamate (2) and isopropyl N-(2-methoxy-5-chlorophenyl) carbamate (3) were compared with isopropyl N-(3-chlorophenyl) carbamate (CIPC) in greenhouse pre-emergent tests on cotton, soybeans, green beans, oats, crabgrass and chickweed on three types of soil. The relative effectiveness of the materials was compared on the basis of the lb. per acre required to produce a 50% growth inhibition. These carbamates possessed considerable herbicidal activity. In general, compounds (1) and (2) were close to CIPC in activity while compound (3) was somewhat less active. Soil had a pronounced effect on the initial activity of the compounds which were more active in sand than loam. [From authors' summary.]

1453. Anon.
Kvarstående effekt av hormonderivat på träd och buskar. **(Residual effects of hormone derivatives on trees and shrubs.)**
Växtskyddsnotiser, 1953, No. 4, pp. 59-64, illus.

Applications of hormone herbicides at low concentrations for the control of weeds on roadsides caused slight injuries to trees and shrubs outside the treated area in July 1952. These symptoms did not reappear the following season. Trees and shrubs, however, that were damaged more severely and had survived showed malformations of leaves in 1953. Affected leaves of birch, bird cherry, service berry, buckthorn and willow are illustrated.

1454. Herbert, F. B.
Aromatic oils for various weed problems.
From abstr. in *Proc. 4th annu. Calif. Weed Conf. 1952*, San Luis Obispo, pp. 120-2.

The main specification for a good all-purpose herbicide oil is that the boiling range should be from about 450° to 750° F. and the aromatic content 40% or higher. Oils are mostly used straight but in some cases emulsions are better. Straight oils are applied successfully for weed control on uncultivated land, in vineyards, in deciduous and citrus orchards, for destruction of undesirable woody species and for drying up seed crops before harvest.

Particular weeds.

(*See also* 1742s.)

1455. Anon.
Standardized plant names.
Bull. C.S.I.R.O. Aust. **272**, 1953, pp. 132.

This list of the standard common names for the more important Australian grasses, other pasture plants, and weeds, replaces Bulletin No. 156. The plants are indexed under botanical names and common names.

1456. Carilli, A.
Prove di lotta contro il *Cyperus rotundus* L. per mezzo di fumiganti del suolo. **(Control of *Cyperus rotundus* by soil fumigation.)** [English summary ½ p.]
Boll. Staz. Pat. veg. Roma, 1952 [issued 1953], **10**: 47-57, bibl. 10, illus.

DD was used in nutgrass control tests prior to planting french beans at Salerno in 1951. Application at the rate of 10 hl. per ha. followed by watering at 10 l. per sq. m. gave the best results, namely 1 nutgrass plant per sq. m., compared with 13 using the same rate of application but without watering, and 431 in the untreated control. The beans were little affected.

1457. Leonard, O. A.
Nutgrass control.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 115-19.

An abbreviated abstract of some of the findings of 11 years' work at the Mississippi Agricultural Experiment Station shows that oils offer the best promise at present for controlling nutgrass under field conditions where oil-tolerant crops are grown. The standard herbicides, both organic and inorganic, were not found completely satisfactory, and fumigation with methyl bromide, while generally effective, is expensive.

1458. Winchester, J. A., and Rodgers, E. G.
Comparative efficiency of several herbicidal treatments in control of nutgrass.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 179-82.

A field experiment was conducted at the University of Florida in 1952 to determine the relative efficiency of 24 herbicidal treatments in controlling nutgrass, *Cyperus rotundus*. Best control was obtained with a 400 and 600 lb. per acre application of Atlacide and 100 lb. per acre of 5 TCO.6. Soil sterilization by high concentration of these proprietary products, however, may under some conditions invalidate their use. [From authors' summary.]

1459. Loustalot, A. J., Cruzado, H. J., and Muzik, T. J.
Effect of CMU on nutgrass (*Cyperus rotundus* L.).
Weeds N. York, 1953, **2**: 196-201, bibl. 4, illus.
In field experiments, following preliminary outdoor trials and laboratory tests, nutgrass tubers were practically eradicated in plots ploughed twice and sprayed with 20 lb. CMU per acre with 6 weeks between the treatments. [See also *H.A.*, 23: 565.]

1460. Becker, E. M.
Johnson grass control.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 90-5.
To control Johnson grass on non-agricultural areas sodium chlorate or preferably the less inflammable chlorate-borate mixtures are used. On arable land 4–5 ploughings per season are recommended and in orchards or vineyards Johnson grass is best controlled by repeated applications of a herbicide oil. The first oil treatment should be made in the spring when the plants are about 6 in. high and later applications should be made each time the regrowth is 6–8 in. tall. The number of treatments required may vary from 4 to 12 a season.

1461. (Buchholtz, K. P.)
Chemical control of quackgrass.
Seed World, 1953, **73** (11): 32, illus.
In preliminary trials in Wisconsin maleic hydrazide greatly reduced the growth of quack grass during the season of application, eliminated a large portion of the infestation and caused no noticeable soil toxicity effects. It is recommended that the chemical should be applied when the quack grass has 4 in. or more of leaf growth, at the rate of 10 lb. in 40 gal. per acre, and the treated weeds ploughed under within 4–8 days. After ploughing, the land is prepared and sown. The crops tested, including snap beans and red beets, showed no reduction in germination.

1462. Anon.
New method of killing mistletoe.
Rural Res. C.S.I.R.O., 1953, No. 3, p. 15, bibl. 1, illus.
In experiments with 7 hormone herbicides injections of 2,4-D into *Eucalyptus* trees of 3 different species attacked by mistletoe showed promise. The injections were made through $\frac{3}{4}$-in. holes in the trunks and autumn treatment appeared best. A dosage rate proportional to the square of the diameter of the tree at breast height proved satisfactory, and for autumn treatment in Canberra a dose of 1·5 g. 2,4-D for a 9-in. diameter tree gave good control without apparent damage to the tree.

1463. Potuljnickiĭ, P. M.
On the origin of non-rubber yielding dandelions infesting kok-saghyz. [Russian.]
Agrobiologija, 1952, No. 2, pp. 45-54, bibl. 6, illus.
Notes are given on the effect of chemicals, NaOH and KOH, on kok-saghyz and dandelion seed, with a possible view to controlling the latter. In a discussion of the origin of weedy *Taraxacum* spp., of which *T. brevicorniculatum* and *T. martii* are the most widespread in the kok-saghyz fields in the Ukraine, it is suggested that they have arisen from the cultivated species.

1464. Nietzke, G.
Seggenbekämpfung mit ätzenden Herbiziden an und in stehended Gewässern. (**The control of sedges by caustic herbicides near or in standing water.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1954, **6**: 23-6, illus.
In preliminary trials sodium trichloroacetate appeared to have a specific herbicidal action against sedges. It was superior to other compounds tested and it proved non-toxic to fish if applied at the normal dosage of 20 g./sq. m.

1465. Drake, R. M.
Experiences in the control of horned pondweed in Atascadero Lake.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 131-5.
On the basis of experience gained in California it is concluded that sodium arsenite applied during late spring in strips upon the lake surface at a sufficient rate to give an average concentration in the entire lake of approximately 4 p.p.m. should result in satisfactory control of horned pondweed, *Zannichellia palustris*.

Control of woody plants.

(*See also* 1485b, h.)

1466. Quick, C. R.
Practical aspects of ecology in the control of woody plants.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 33-6.
Dealing largely with the ecological aspects of suppression and eradication of *Ribes roezli*, alternate host of white pine blister rust.

1467. Searcy, V. S.
The control of cherokee rose (*Rosa bracteata*) with chemicals.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 189-91.
For the control of cherokee rose with 2,4-D [see earlier report, *H.A.*, 22: 2504] water was found to be a better carrier than oils. Other successful treatments were concentrated Borascu at 7·5 or more lb. per 100 sq. ft. or other compounds containing an equivalent amount of boron oxide, Polybor Chlorate at 6 lb. per 100 sq. ft. and CMU at 75 lb. per acre.

1468. Robinson, B. D., and Parsons, W. T.
The relative efficiency of 2,4,5-T and a mixture of 2,4,5-T and 2,4-D in the control of blackberry bramble.
J. Aust. Inst. agric. Sci., 1953, **19**: 257-61, bibl. 3, illus.

A randomized block layout developed for carrying out accurate trials on the control of wild blackberries is described. Treatments compared were sprays of the butyl ester of 2,4,5-T, the ethyl ester of 2,4-D and a mixture of the two, all being applied at rates of ½, 1, 2 and 4 lb. per acre. 2,4,5-T alone gave highly significant control, the percentage kill increasing with dosage up to 1 lb. per acre but not above. 2,4-D alone had no significant effect. Adding 2,4-D to 2,4,5-T did not increase, and in fact at some rates reduced, the efficiency of 2,4,5-T.

Weed control in ornamentals and turf.

1469. Anon.
New weedkiller for daffs and narcissus.
Comm. Gr, 1953, No. 3021, p. 1007.

Field trials in the fens, carried out over 2 seasons, have shown that Hawmac, an arsenical material, will give satisfactory pre-emergence weed control in daffodil and narcissus plantings. Provided treatment is carried out before the bulb foliage appears, no damage will be done to the crop. It is successful against most broad-leaf weeds and partially checks the growth of grasses. The material should be applied at the rate of 1 gal. in 100 gal. water per acre and the cost is 24s. per acre.

1470. (Lantz, H. L.)
Sterilize soil before seeding for tough turf.
Ia Fm Sci., 1953, **8** (5): 11.

Sterilizing the surface soil with Aero Cyanamide, applied in midsummer at 75 lb. per 1,000 sq. ft., killed all vegetation and showed promise in clearing the upper 1–2 in. soil layer of weed seeds. The toxic materials of the chemical disappeared in about 4 weeks from application and the area could then be sown.

1471. Robinson, B. P.
The selective control of spotted spurge *Euphorbia supina* (*E. maculata, nutans*) in close cut turf.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 192-3.

MCP applied at 2 pt. per acre in 2 treatments at a 7-days interval gave very good control of spotted spurge without discolouring or checking the growth of Bermuda grass. Two applications of PMAS at 16 lb. per acre (6 oz. for 1,000 sq. ft.)+2,4-D at ½ lb. per acre also gave very good control but temporarily discoloured the Bermuda grass. CMU at ½ and 1 lb. per acre gave good weed control but excessively damaged the close-cut grass.

1472. Rea, H. E.
Ammonium nitrate spray as a contact weedkiller.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 176-8.

Ammonium nitrate, normally used as fertilizer, is an effective contact herbicide when it is applied in water as a foliage spray to tender vegetation. Semi-annual treatments of 1 lb. in 1 gal. of water applied at 4 gal. per 1,000 sq. ft. to a mixed Bermuda and San Augustine lawn on a fine sandy loam controlled most weeds with only temporary injury to the grasses. [From author's summary.]

Weed control in sugar cane and other tropical crops.

(*See also* 1485f, 1726, 2026, 2035.)

1473. Burgesser, F. W.
Pelletized weed killers.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 76-7.

Pellets, about 1/16 in. in diameter and ⅛ in. long, containing 10% 2,4-D, were developed for weed control in sugar cane in Hawaii. By this new method of application drift was reduced and injury to susceptible crops prevented. The possibility of pelleting other herbicides is discussed.

1474. Hebert, L. P.
A method of measuring the quantity of viable Johnson grass seed in the soil.
Proc. Amer. Soc. Sugar Cane Tech. 1946-1950, 1953, pp. 71, 73-4.

Soil samples taken from depths of 0–6 in., 6–12 in. and 12–18 in. were placed in greenhouse flats and a count was kept of the emerging Johnson grass seedlings over 43 days.

1475. McCall, G. L.
The use of CMU in the sugar industry.
Sugar J., 1953, **16** (6): 28-32.

Johnson grass control in cane consists of 3 basic steps: (1) 6–12 fortnightly fallow-ploughings in spring/early summer to destroy the rhizomes; (2) control on unploughable banks and headlands with 80% CMU at 40-80 lb./acre which also prevents seedling re-establishment for 1 season, abundant water being required (400 gal. per acre) to ensure thorough contact with the roots; and (3) pre-emergence control in autumn or early spring with 3–3¾ lb. active CMU per acre as a blanket spray or 1–1¼ lb. on 2 ft. strips centred on the rows. Notes are also given on weed control in factory areas.

1476. Hardcastle, W. S., and Stamper, E. R.
The effect of chemicals on the control of Johnson grass and yields of sugarcane in Louisiana.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 156-9.

The recommended practice of using TCA and 2,4-D [see also *H.A.*, 23: 623] for Johnson grass seedling control continued to give the best results as regards weed control, cane yield and sugar production. [See also Abstr. 1460 and 1485f.]

1477. Colmer, A. R.
The action of 2,4-D upon the *Azotobacter* of some sugarcane soils.
Abstr. in *6th Proc. south. Weed Conf. 1953*, New Orleans, La, p. 62.

The results of the work outlined showed that the commonly used rates of 2 or 4 lb. (1 or 2 p.p.m.) per acre of 2,4-D had no deleterious effect upon the *Azotobacter* of the sugar cane soils.

1478. Orsenigo, J. R., and others.
Systemic foliage distortions in coffee attributed to 2,4-D.
Turrialba, 1953, **3**: 100-1, bibl. 4.

At Turrialba in the autumn and winter of 1946 the butyl ester of 2,4-D was applied to coffee soils as a weed killer. Some coffee leaf distortion followed in about a month but was not serious enough to warrant stopping the use of the substance. Distortion also followed application of the iso propyl ester of 2,4-D in aqueous solution to the leaves. Leaf distortions became apparent about 4 weeks after treatment and the new leaves then for a time showed increasing distortion. Later, however, the phenomena became less pronounced and the trees developed and fruited normally.

Weed control in vegetables, fruit and tobacco.

1479. Zonderwijk, P.
Onkruidbestrijding. **(Weed control.)**
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 221-7, being *Meded.* **120.**

Weed control experiments carried out by the Plant Pathology Service, Wageningen, during 1951 and 1952 are summarized. The following are of horticultural interest. *Weed control in peas.* Wild oats (*Avena fatua*) and foxtail (*Alopecurus myosuroides*) could be satisfactorily controlled in peas by 50% IPC (isopropyl-N-phenylcarbamate) at 15–20 kg./1,000 l. water/ha. It should be applied after the peas have emerged. IPC dust, mixed with a sand spreader and worked lightly into the soil, also gave good results. *Weed control in beet.* Pre-emergence oil sprays gave good control of young weeds but the possible application period, between weed emergence and beet emergence, was very limited. *Weed control in strawberries.* A mixture of 15–20 kg. NIX+10 kg. IPC in 1,000 l. water per ha. gave very satisfactory results when used immediately after harvest. It was especially valuable for chickweed control. When the herbicide was used before flowering yields were reduced by half. *Weed control in beans and cabbage.* NIX at 15 kg./ha. did not give effective weed control and damaged the crop. *Hormone herbicides for particular weeds.* 2,4,5-T at 2–3 l. per ha. gave good control of *Urtica dioica* when 10–20 cm. high, and at 4 l. per ha. controlled *Rubus* spp. when applied after the beginning of flowering. Wild carrot (*Daucus carota*) was killed by 2,4-D ester, the sodium salt of 2,4-D or MCPA applied at the end of May. *Control of couch grass in orchards.* An autumn application of TCA at 50–75 kg. in 1,000 l. water per ha. caused no damage to young apple trees and gave good control of couch grass until the following spring. The treatment should be combined with cultivation measures. IPC gave less satisfactory results.

1480. Ashizawa, M., and Kanabe, T.
Studies with 2,4-D treatments on growth of young fruit trees. I. Effects of 2,4-D and soil treatments on fruit tree growth. [Japanese, with English summary ¾ p.]
Tech. Bull. Kagawa agric. Coll., 1953, **4**: 146-58, bibl. 38, illus.

In laboratory tests young peach, Japanese sand pear [*Pyrus pyrifolia*?], apple and trifoliate orange trees and vines were placed for various periods in aqueous solutions of 2,4-D at concentrations ranging from 0·7 to 500 p.p.m. The times taken by the higher concentrations to cause death are recorded. The lowest concentrations at which growth was checked were 0·7 p.p.m. for peach, 10 p.p.m. for apple and 12·5 p.p.m. for trifoliate orange. Application of 2,4-D solutions (10–60 p.p.m.) to the soil in the field resulted in the experimental plants producing abnormal roots and having a lower weight than that of the controls.

1481. Carlson, R. F., Grigsby, B. H., and Carolus, R. L.
Weed control in established asparagus plantings with CMU (3-[p-chlorophenyl]-1, 1-dimethylurea). (A preliminary report.)
Quart. Bull. Mich. agric. Exp. Stat., 1953, **36**: 163-8, bibl. 4, illus.

CMU applied at 0·8, 1·6 and 2·4 lb. per acre either pre- or post-harvest successfully controlled weeds without apparently damaging the asparagus. In commercial plantings the best results can be expected from CMU at 1·6 lb. per acre (2 lb. of the 80% preparation) dissolved in 40–50 gal. and applied before weed seedlings begin to emerge. If the material is applied both before and after harvest the combined rates should not exceed 2·4 lb. per acre.

1482. Ivens, G. W.
Weed control by selective herbicides.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 29-35.

The experiments described have been conducted at Luddington by the Unit of Experimental Agronomy, Oxford. The general conclusions are that several materials, in particular PCP fortified oils, show promise as pre-emergence herbicides for onions, lettuce and possibly red beet. Potassium cyanate remains a possible post-emergence material for onions, but for the time being the economic feasibility of the treatment remains doubtful.

1483. Livingston, G. A.
Field vegetable-herbicide trials in the lower Rio Grande Valley of Texas.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 165-9.

In experiments with 19 crops and a large number of herbicidal compounds the following herbicide-crop combinations showed promise for economic pre-emergence weed control: Dinitro compounds—cantaloupe, castor bean, snap and lima beans and corn; CMU—castor bean, snap and lima beans; Crag Herbicide 1—cantaloupe, snap and lima beans, corn and mustard; Alanap (N-1 naphthylphthalamic acid formulations)—cantaloupe, castor bean, snap bean; endothal—cantaloupe, castor bean, radish, mustard and beet.

1484. Hill, G. D., Klingman, G. C., and Woltz, W. G.
Chemical weed control in tobacco plant beds.
Bull. N.C. agric. Exp. Stat. **382**, 1953, pp. 43, bibl. 69, illus.

Field studies with tobacco plant beds located on 3 different soil types in North Carolina were conducted (1) to study the interaction between certain weeds and various chemical treatments, (2) to investigate chemicals for possible spring use for control of specific weeds and (3) to determine the residual effect of chemical treat-

ments on the germination and subsequent growth of tobacco plants. Results obtained with 17 materials or groups of materials are tabulated. The most effective chemical in this study was methyl bromide applied in the spring at 25 c.c. per sq. yard, giving a high degree of weed control in each soil type without damaging the tobacco.

Noted.

1485.

a AKESSON, N. B.
Recent investigations of spraying accessories: A progress report on nozzles.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 58-64, illus.

b ANON.
Dalapon—a new systemic grass killer.
Down to Earth, 1953, **9** (3): 10-11, illus.
2,2-dichloropropionic acid.

c BARANEK, P. P.
The output of spray rigs for a 2,4-D ditch-bank spraying.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 49-57.

d COTTIER, E. F.
Control and eradication of vegetation in asphalt paving and concrete joints and cracks.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 174-5.
With unrefined sodium borate ore (regular or concentrated Borascu) and Polybor-Chlorate.

e DARROW, R. A., AND MCCULLY, W. G.
Chemical control in mixed brush areas of Texas.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 194-7.
With 2,4,5-T and mixture of 2,4-D and 2,4,5-T.

f GODCHAUX II, L.
Control of Johnson grass [in sugar cane] by the use of sodium chlorate.
Proc. Amer. Soc. Sugar Cane Tech. 1946-50, 1953, pp. 18-24.
See also *H.A.*, 20: 237.

g HAMILTON, R. H., AND ALDRICH, R. J.
Failure of light activated riboflavin to counteract the growth inhibition of two benzoic acid derivatives.
Weeds, N. York, 1953, **2**: 202, bibl. 9.
2,3,5-triiodobenzoic acid (TIBA) and ethyl ester of trichlorobenzoic acid (ethyl TCB).

h MCCULLY, W. G.
Experimental equipment for application of herbicides to woody plants.
6th Proc. south. Weed Conf. 1953, New Orleans, La, pp. 198-200, illus.

i MINISTRY OF AGRICULTURE, LONDON.
Thistles and their control.
Adv. Leafl. Minist. Agric. Lond. **51,** revised 1953, pp. 5.
Species of *Cirsium*, *Sonchus* and *Carduus* and control by MCPA and 2,4-D.

j NIELSEN, W. R.
Weed control in row crops.
Proc. 4th annu. Calif. Weed Conf. 1952, San Luis Obispo, pp. 87-90.
Materials and methods in carrots, onions and celery.

k PETTEY, F. W.
The boring beetles of prickly pear in South Africa and their importance in the control of *Opuntia megacantha*.
Sci. Bull. Dep. Agric. S. Afr. **340,** 1953, pp. 36, illus.
Lagochirus funestus and *Cactophagus spinolae*.

VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

General.

(*See also* 1062-1065, 1068, 1078, 1125, 1128, 1129, 1131-1141, 1145b, 1236g, 1375, 1417, 1435m, 1647c, r, y, z, 1648b, 2098, 2102, 2104.)

1486. WARNE, L. G. G.
Vegetable research in Pakistan.
Grower, 1953, **40**: 1192.
A note mainly concerned with the Vegetable Research Station at Murree in the Punjab, at an altitude of 7,500 ft. The station is on a steep hillside and is terraced. Cultivations are mainly by hand. In the author's view its status might perhaps be regarded (apart from teaching) as equivalent to the county station which used to exist some years ago in the U.K. Its chief interest is now in testing the suitability of new crops such as ginger and turmeric, in carrying out variety trials and in problems of disease and pest control.

1487. BIELKA, R.
Über die Rand- und Nachbarwirkung, den Einfluss der Fehlstellen und die Mindestteilstückgrösse bei Gemüsefeldversuchen. (**The effects of headlands, neighbouring plots and gaps in relation to minimum plot size in vegetable field trials.**)
Arch. Gartenb., 1953, **1**: 112-42, 149-96, bibl. 41.
The minimum plot size (in m^2) and—in some cases—the minimum number of plants required for the accurate evaluation of vegetable field trials were found to be: for kohlrabi, 12 and 120; cabbage, 12 and 60; cauliflower, 12 and 50; leeks, 12; celeriac, 10 and 50; peas, 10; dwarf beans, 7; carrots, 4; lettuce, 3 and 30. Guard rows were shown to be necessary for varietal trials with lettuce and for all manurial experiments and spacing trials in which yields are expressed by weight.

In manurial experiments strips of 1 m. width were the minimum dividing distance required between neighbouring plots. In view of the inconclusive results obtained in the statistical treatment of gaps, Fisher's analysis of covariance is recommended for the solution of this problem. A method has been evolved for the evaluation of yield data which is based on quality grades instead of on weight.—Univ. Halle.

1488. Hartmair, V.
Über die Grundlagen des alpinen Gemüsebaues. (**On vegetable growing at high altitudes.**) [English, French and Spanish summaries.]
Mitt. Klosterneuburg, Ser. B, 1954, **4**: 1-15, illus.
The conditions for vegetable growing in the alpine regions of Austria are discussed and data are presented of variety tests carried out at altitudes of 640 and 1,150 m.

1489. Spurlock, A. H., Brooke, D. L., and Greene, R. E. L.
Labor and material requirements for crops and livestock. II. Truck crops.
Bull. Fla agric. Exp. Stats **489**, 1952, pp. 80, bibl. few in text, maps.
The crops for which data are tabulated on labour and material requirements and on yields in several districts of Florida include tomato, bean, celery, green pepper, cucumber, watermelon, cabbage, strawberry, squash, eggplant and lettuce.

1490. Odland, M. L., and Noll, C. J.
Vegetable variety trials—1952.
Progr. Rep. Pa agric. Exp. Stat. **92**, 1953, pp. 10, illus.
Records are tabulated on plant uniformity, disease resistance, vigour and fruit type for sweet corn, tomato, eggplant, lima and snap beans, sweet pepper, summer squash and cabbage.

1491. Anon.
An agricultural survey of a village in the Lam Tsun Valley.
Food and Flowers, 1953, No. 3, pp. 30-9.
This article, issued by the Department of Agriculture, Hong Kong, includes a survey (4½ pp.) of local vegetable crops, with special reference to practices and economics.

1492. Aladžajkov, L.
Some problems of vegetable growing in Macedonia. [Jugoslav, with French summary.]
Annu. Inst. Rech. agron. Skopje, 1952, **1**: 59-103, bibl. 27.
Variety, fertilizer and spacing trials are reported for tomato, pepper, haricot bean and cauliflower.

1493. Anon.
Venezuela produce semillas para horticultura. (**Venezuela produces vegetable seeds.**)
Agric. venezol., 1953, **18** (162): 8-15, illus.
Vegetable seeds are produced at the Estación de Sanare, Estado Lara, altitude 1,352 m. The principal species are cabbage (of which large-scale production to supply the whole of the country's needs is planned), cauliflower and onion. Tomato and sweet pepper seed is also produced.

1494. N.S.W. Department of Agriculture, Division of Plant Industry.
New South Wales trials with pelleted seed.
Agric. Gaz. N.S.W., 1953, **64**: 595-6, bibl. 2.
Trials begun in 1946 have been discontinued. Pelleting vegetable seed has shown no advantage and in many cases has adversely affected germination.

1495. Woess, F.
Versuch mit Folien aus Polyvinylchorid als Glasersatz im Frühgemüsebau. (**Tests of polyvinylchloride film as a substitute for glass in the frame culture of early vegetables.**)
Bodenkultur, 1953, **7**: 134-41, bibl. 8.
Such polyvinylchloride films as are at present available in Austria, proved to be inferior to glass as a material for hotbed lights.

1496. Antonjuk, A.
The use of waste heat from industry in vegetable growing. [Russian.]
Social. Seljsk. Hoz., 1953, No. 10, pp. 44-50.
A discussion on utilizing waste heat, mainly hot water from iron foundries, electricity works, etc., for soil warming in hot, cool and propagating frames and open ground, and for heating glasshouses. It is shown that at a depth of 10 cm. the temperature of the soil warmed by hot water pipes placed at a depth of 30 cm. was only 10° C. below the temperature of the water in the pipes. In cold areas with short growing seasons outdoor soil warming has a special value for prolonging the season.

1497. Koroljkov, E. D.
A new method of soil warming for the production of early vegetables. [Russian.]
Priroda, 1953, **42** (11): 100-3, illus.
The production of early vegetables near large towns and industrial centres can be raised by utilizing surplus hot water, steam or gases for the warming of glasshouse, frame and outdoor soils. Near Moscow on heated open ground, radish, lettuce and spinach, sown or planted at the end of March, were harvested early in May, and followed by tomato, cucumber, sweet pepper, eggplant and melon. In new steam or hot water heated frames, in addition to 2 lengths of pipes in the soil, a pipe each is built into the sides of frames, thus providing even temperature both below and above the soil surface. Numerous advantages are claimed for this type of frame construction.

1498. Krivolapov, G., and Dovgopolyĭ, G.
All the year round vegetable growing. [Russian.]
Kolhoz. Proizv., 1953, **13** (10): 17-18.
The working programme of a Collective Farm in the Kharkhov area is outlined in which the greenhouses and frames are used all the year round for either crop production or raising plants. For the production of early cauliflower, tomato, cucumber and watermelon plants peat-manure pots [blocks] were used with great success. In 1953 pots made of 65% granulated peat, 30% well-rotted farmyard manure and 5% fresh horse manure plus 3–4 kg. ammonium nitrate, 8–10 kg. superphosphate and 5 kg. potassium chloride per ton of mixture gave particularly good results.

1499. GROSSENBACHER, F.
Pikieren am laufenden Band. **(Pricking out on a conveyor belt.)**
Schweiz. Gärtnerztg, 1954, **57** (7): 4, illus.

When plants were placed on a conveyor belt across a garden frame, one man pricked out comfortably 1,800–2,000 cabbage seedlings per hour compared with about 600 without the conveyor. The acquisition of a conveyor belt, which may be used also for other operations, is considered to be an economic investment in market gardens. The installation is illustrated.

1500. RADEMACHER, H.
Gemüse als Windschutz für Gemüse. **(Vegetables as windbreaks for vegetables.)**
Gartenwelt, 1954, **54**: 19-20, illus.

In three years' trials at Aurich Horticultural Experimental Station the following combination of crops proved very successful: broad beans, celeriac and cucumbers, surrounded by runner beans as a windbreak.

1501. GEISSLER, T.
Über die Wirkung chlorid- und sulfathaltiger Düngemittel auf den Ertrag einiger Gemüsearten unter verschiedenen Umweltverhältnissen. **(The effect of chloride- and sulphate-containing fertilizers on the yield of certain vegetables under different environmental conditions.)**
Arch. Gartenb., 1953, **1**: 233-343, bibl. 105, illus.

The following are among findings of general significance: (1) *The effect of water on chloride-sulphate action.* Spinach, radishes, carrots, dwarf beans and tomatoes were grown in Mitscherlich containers at different soil moisture levels which were kept constant. At low moisture levels higher yields were obtained with chlorides and at higher moisture levels with sulphates. In all cases water consumption was lower with chlorides than with sulphates; to some extent, therefore, chloride tolerance appears to be associated with the water requirements of a species. (2) *The effect of chloride and sulphate ions on the action of potassium under different moisture and light conditions.* A generous supply of K was found to counteract the effect of light deficiency in spinach and radishes. In the presence of sulphates the utilization of light was markedly less affected by low K supplies than in the presence of chlorides. K and chloride ions are therefore believed to be antagonistic in their effect on photosynthesis. (3) *The effect of nitrate and ammonia nutrition on the action of chloride-sulphate ions* in spinach and radishes. The N effect proved to be independent of sulphate and chloride nutrition, but the action of chlorides was shown to be favourable in combination with nitrates and unfavourable in combination with ammonia. In the case of sulphate nutrition the form of N supplied was of little importance; sulphates were more favourable to root development in radish than chlorides.

In a general discussion it is pointed out that while a clear separation is not possible, it is admissible to speak of chloride-tolerant and -sensitive vegetables, dwarf beans and tomatoes belonging to the first and radishes and carrots to the second category, spinach being intermediate. On the whole, crops which are incapable of utilizing K economically and consequently have high K requirements, are more susceptible to chloride injury than are those with low K requirements. By increasing K requirements light deficiencies will also increase susceptibility to chloride injury.

The following are some of the practical conclusions drawn from the investigation: In vegetable forcing, where light is a limiting factor, sulphate fertilizers are to be preferred, especially for cucumbers and tomatoes. Ammonium chloride should not be used in vegetable culture, but there is no objection to the application of chloride-containing potassium salts on vegetable field crops, with the exception of crude potassium salts, the application of which should be restricted to celeriac, spinach, asparagus, beets and other chloride-tolerant crops on light soils. For field crops with a low chloride tolerance, such as kohlrabi, radishes, onions, beans, cucumbers, tomatoes and melons, the use of potassium sulphate is recommended; N should be supplied as nitrate and the P_2O_5 supply should be generous.—Inst. f. Gemüsebau. Grossbeeren.

1502. WESTGATE, P. J.
Preliminary report on chelated iron for vegetables and ornamentals.
Proc. Soil Sci. Soc. Fla 1952, **12**: 21-3, being *J. Ser. Fla agric. Exp. Stat.* **136.**

Various iron chlorotic vegetables in the field, including corn, cabbage, mustard greens, and Chinese cabbage, associated with excessive copper in the soil, have responded favourably to chelated iron (Fe—EDTA) applied to the soil, whereas ferrous sulphate alone was ineffective except as a foliar spray. Iron chlorotic ornamentals, including gladiolus and hibiscus, have responded in a similar manner. Celery is still under observation. [Author's summary.]

1503. BROWN, B. A.
Boron research at the Storrs Agricultural Experiment Station.
[*Publ.*] *Storrs agric. Exp. Stat.* **INF-47,** 1953, pp. 13.

A review is given of 18 years' research on boron in Connecticut soils and vegetable crops. "Overliming injury" was found to vary widely in degree with type of soil and lime and with crop; in most cases injury did not occur on soils treated with boron.

1504. ROGALEV, I. E.
The use of carbon dioxide as a fertilizer in greenhouses. [Russian.]
Sad i Ogorod, 1953, No. 10, pp. 17-21, illus.

In large-scale trials with cucumbers and tomatoes, using altogether 10,000 plants, CO_2 applications produced substantial yield increases and earlier maturing, and often better quality crops. The gas was released in the morning when the plants assimilated it most intensively; no releases were made on dull days. A greenhouse atmosphere with about 0·3% CO_2 content was found the most satisfactory, and that amount is shown to have almost doubled the sugar content of tomatoes as compared with the controls. With cucumbers the highest yield increases were obtained when the gas was applied from May onwards; in July, after the practice had been discontinued, subsequent yields from both previously treated and untreated plants were about equal. The use of CO_2 is regarded as economic.

1505. Janes, B. E.
Composition of Florida-grown vegetables. III. Effects of location, season, fertilizer level and soil moisture on the mineral composition of cabbage, beans, collards, broccoli and carrots.
Bull. Fla agric. Exp. Stats **488**, 1951, pp. 32, bibl. 16.

Samples of the crops, grown at 3 fertilizer levels, were analysed for yield, dry weight, ash and Ca, Mg, K, Na, Mn, Fe, S and P contents. The results are tabulated in detail. The largest differences in mineral composition were associated with location, soil type, or at least soil environment, being the main factor. Climate influenced composition but to a lesser extent than soil environment. Fertilizer level had but little effect on composition. Varying the amount of soil moisture by irrigation resulted in marked differences in mineral composition when expressed on a fresh weight basis but there was little or no difference when expressed on a dry weight basis. [For Parts I and II of this series see *H.A.*, 20: 247 and 21: 542.]

1506. Nettles, V. F., Jamison, F. S., and Janes, B. E.
Irrigation and other cultural studies with cabbage, sweet corn, snap beans, onions, tomatoes and cucumbers.
Bull. Fla agric. Exp. Stats **495**, 1952, pp. 26, bibl. 12.

Sprinkler irrigation experiments were conducted over a six-year period with cabbage, sweet corn, snap beans, onions, tomatoes and cucumbers. Supplemental irrigation did not result in increased yields of crops every season, but in some years or seasons it was responsible for the difference between a successful harvest and crop failure. Too heavy an application of water may result in a reduction in yield. Light application of water to cabbage in 1945, light and split application on beans in 1946 and split application on this crop in 1947 produced significantly higher yields than heavy application. Observation of crops heavily irrigated indicated that perhaps excessive leaching of plant nutrients occurred. Side-dressing with nitrogen gave increased yields in three of the five crops of cabbage. No significant interaction was found between irrigation and fertilizer treatment. With other conditions for normal growth present satisfactory growth and yield of vegetables can be expected from $\frac{1}{2}$ inch of water as natural rainfall or as supplemental irrigation every six days. [From authors' summary.]

1507. Wood, R. D., and Harrison, H. C.
Responses of plants to rhenium.
Plant Physiol., 1953, **28**: 755-8, bibl. 1.

A number of plants including tomato, bean, pea and geranium showed marked responses to rhenium salts. The responses included darkening of green colour, brown spotting on the leaves, leaf distortion and necrosis, and death.

1508. Hudson, W. J., and Cradock, F.
Major and minor elements: deficiencies in pastures and crops in New South Wales.
Agric. Gaz. N.S.W., 1953, **64**: 456-9, 474-5, 523-7, 597-9, bibl. 9, illus.

Phosphorus and nitrogen deficiencies are widespread in New South Wales. The trace elements molybdenum and boron are also deficient in vegetable crops in various localities which are shown on a map.

1509. Walker, J. C.
Disease resistance in the vegetable crops II.
Bot. Rev., 1953, **19**: 605-43, bibl. 266.

Disease resistance in the following crops is discussed: Garden and lima beans, celery, crucifers, cucurbits, lettuce, onion, garden pea, spinach, sweet potato, eggplant, pepper, potato and tomato. [For a short abstract of Part I dealing with the nature of disease resistance see *H.A.*, 11: 1212.]

1510. Lyall, L. H.
Breeding vegetables for disease resistance.
Rep. Proc. 9th annu. Mtg West Canad. Soc. Hort., 1953, pp. 16-18.

The breeding of peas for resistance to leaf and pod spot (*Ascochyta pisi*) and of tomatoes for resistance to 4 diseases is briefly discussed.

1511. Piemeisel, R. L.
Replacement control: changes in vegetation in relation to control of pests and diseases.
Bot. Rev., 1954, **20**: 1-32, bibl. 109.

Replacement control means the indirect control of pests by bringing about changes in vegetation. Such changes involve the replacement of weeds and other ephemeral plants by a more desirable cover of grasses or native perennials and result in the control of those insects and small animals which depend upon the weeds for the development of high populations. The increase of curly top disease of beet and other vegetables in western U.S.A. was the result of the replacement of the natural cover of perennials in semi-desert country by weeds, the most abundant of which were suitable hosts for the beet leafhopper (*Circulifer tenellus*), which spreads the virus. Investigation led to the conclusion that the leafhopper could be controlled if unfarmed land could be maintained as good desert range. Experiments showed that the establishment of a desirable cover of annuals is comparatively simple but that its maintenance is difficult. Further development to a stable cover of native perennials is a much more complex matter which the author discusses at length.

1512. Kelman, A.
The bacterial wilt caused by *Pseudomonas solanacearum*. A literature review and bibliography.
Tech. Bull. N.C. agric. Exp. Stat. **99**, 1953, pp. 194, bibl. pp. 38, illus.

This review covers the history of the diseases caused by *P. solanacearum*, common names, economic importance, world distribution, host range, symptomatology, etiology, host-parasite relations, methods of dissemination, the effects of environment, research techniques, control by the use of resistant varieties (of, among others, tobacco, tomato, eggplant, pepper and banana) and by grafting susceptible hosts on resistant rootstocks, and methods of exclusion, eradication and crop protection.

1513. Mackay, J. H. E., and Friend, J. N.
The effectiveness of antibiotics against some bacterial plant pathogens.
Aust. J. biol. Sci., 1953, **6**: 481-4, bibl. 8.

In vitro tests of six purified antibiotics against bacterial pathogens of dwarf bean, tomato and *Brassica* spp. showed that streptomycin and aureomycin were slightly more effective than terramycin and all three were more effective than penicillin, bacitracin and chloromycetin. *Corynebacterium michiganense* (Smith) Jensen, the only Gram-positive organism tested, was the most sensitive and the only organism inhibited by all six antibiotics within the concentrations used. [Authors' summary.]

1514. Blumer, S.
Über die Eignung von *Penicillium expansum* für eine biologische Bekämpfung von Schwarzfusspilzen (*Rhizoctonia solani* Kühn). (**On the suitability of *Penicillium expansum* for the biological control of post-emergence damping-off (*Rhizoctonia solani*).**) [English summary ⅔ p.]
Phytopath. Z., 1953, **21**: 163-88, bibl. 22.

Attempts to control *Rhizoctonia solani* in compost soil by adding *Penicillium expansum* or *Trichoderma viride* to the medium failed, although an antagonistic relationship between the fungi appeared to exist in this soil. *In vitro*, filtrates of *Rhizoctonia* cultures did not affect seed germination though they inhibited root growth, even in plants resistant to this fungus (tomato). Filtrates of 11–13-days-old *P. expansum* cultures and patulin (the active agent) inhibited seed germination, root growth and the growth of *R. solani*. Post-emergence damping-off was shown to be an unspecific symptom that can be produced by culture filtrates of *Rhizoctonia*, *P. expansum*, patulin and other substances after mechanical injury to the hypocotyl or pre-treatment with chloroform or ether. The tests were carried out on cauliflower, radish and black radish seedlings.—Wädenswil.

1515. (Newhall, A. G.)
Results of 1953 fungicide tests.
Agric. Chemls, 1954, **9** (1): 69-73, 131-3, (3): 57-62, 133-4.

A. G. Newhall assembled and summarized data of fungicide tests submitted to a committee by 75 pathologists in the United States and Canada. Over 120 products were tested in 1953 on 41 crop plants. An annotated list of fungicides in alphabetical order is followed by notes on the control of vegetable diseases achieved with these chemicals. In the concluding part results are given of various seed and soil treatments and of fungicidal tests carried out on citrus, nuts, ornamentals and small fruits. So-called highlights of all the trials are discussed separately.

1516. Blackith, R. E.
Fumigation of agricultural products. V. The distribution of nicotine vapour in glasshouses.
J. Sci. Food Agric., 1953, **4**: 512-17, bibl. 8.

The determination of nicotine vapour in glasshouses is described and the factors that influence the distribution of the vapour are assessed. Glasshouses are so leaky that effective fumigation ends when the nicotine has been evaporated. The optimum dosage is about ¼ oz. per 1,000 cu. ft. and the rate of evaporation should be about ¼ oz. per hour for each of the normal spirit lamp evaporators. Fumigation should not be done while the temperature is rising or when there are strong cross winds. [From author's summary.]

1517. Gray, H. E.
Portable equipment for steam soil sterilization.
Bull. N.Y. St. Flower Grs, 1953, No. 100, pp. 2-3, illus.

An account is given of the portable Steam-Flo soil sterilizer and of tests carried out on it, both on greenhouse benches and out of doors, at Cornell University. It has been found to combine ease of movement, adequate capacity and low cost. Plastic covers recently developed for soil sterilization have also been found effective and easy to handle.

1518. Lauenstein, A.
Untersuchungen über die Verwendbarkeit frisch gedämpfter Erde im Gemüsebau. (**The use of soil recently steam-sterilized for raising vegetable seedlings.**)
Arch. Gartenb., 1953, **1**: 20-62, bibl. 14, illus.

Experiments were carried out to test the widely-held belief that steam-sterilized soil must be kept for some time before it can be used safely for raising vegetable seedlings. Cucumber, kohlrabi, spinach, leek, lettuce, chives and cress were found to germinate and grow at least as well in compost soils that had just cooled down after sterilization as in similar soils that had been kept for several months after the treatment. The germination of tomato seed, however, was distinctly inhibited in freshly-steamed compost or in sterile sand. This inhibition was reduced by inoculating the medium with bacteria from the rhizosphere of tomatoes, a finding that requires further study. Changes in chemical and physical properties of the soil resulting from steam sterilization are also discussed.—Zentrale Landtech., Quedlinburg.

1519. Lucas, R. E., and Dieter, C. E.
Ethylene dibromide for the control of nematodes in the organic soils of Michigan.
Down to Earth, 1953, **9** (3): 6-9, bibl. 7, illus.

Root knot, root lesion, pin and stubby root nematodes are commonest, and carrots, celery and onions appear to be the most susceptible crops. Soil fumigation experiments with carrots and parsnips have shown that nematodes can be successfully controlled with about 6 gal. of ethylene dibromide per acre. Autumn treatments appeared better than spring treatments because of more favourable soil moisture and temperature conditions. Good results have also been obtained in celery and onions, but the fumigant has, at times, been injurious to onions.

1520. Merrill, L. G., Jr.
Granular pesticide formulations for control of root maggots in vegetables on organic soils. (A preliminary report.)
Quart. Bull. Mich. agric. Exp. Stat., 1953, **36**: 173-8, bibl. 5, illus.

Both heptachlor and dieldrin at 0·75 lb. per acre, each mixed with thiram at 1·5 lb. per acre and applied in granulated form to onion seeds gave good control of maggots and smut. For the successful control of maggots in radishes heavier doses of the pesticides were

needed. Before the treatments can be recommended, however, residue determinations must be made.

1521. Mallo, R. G.
Resultados de la lucha contra insectos y ácaros mediante un nuevo producto sistémico E 1059. **(The results of experiments on the control of insects and mites with the new systemic product E.1059.)**
Idia, 1953, No. 66, pp. 1-9, bibl. 3.

Notes are given on experiments on the control of the following insects and mites by soil applications of E.1059 (diethoxythiophosphoric acid ester of 2-ethylmercaptoethanol): aphid and red spider on roses and melons, *Gargaphia solani* on eggplant, citrus black aphid (*Toxoptera aurantii*), red spider on carnation, *Myzus persicae* and *Agalliana ensigera* on spinach beet, *Conotrachelus cristatus* on celery, red spider and an aleurodid on tomato, and *Brevipalpus*. The results varied with species of insect and plant and were negative against the aleurodid and *Brevipalpus*. In one experiment the insecticide appeared to have a fumigatory effect on red spider.

1522. Grandori, R.
La cianamide insetticida sistemico. **(Calcium cyanamide as a systemic insecticide.)**
Ital. agric., 1953, **90**: 850-2.

Among experiments in which the systemic action of calcium cyanamide was tested there was one in which specimens of *Aphis fabae* were placed on treated broad beans. The mortality was 47% in 5 days with 0·2‰ cyanamide, 78% in 5 days with 0·3‰ and 100% in 6 days with 0·4‰.

1523. Reynolds, H. T., Anderson, L. D., and Swift, J. E.
Tests with two systemic insecticides on vegetable and field crops in Southern California.
J. econ. Ent., 1953, **46**: 555-60, bibl. 3, being *Pap. Calif. Citrus Exp. Stat.* **763.**

Both octamethyl pyrophosphoramide (schradan) and systox gave very good control of cabbage aphid, *Brevicoryne brassicae*, on cabbage and fair to good control of tulip bulb aphid, *Anuraphis tulipae*, on carrots, but were unsatisfactory against onion thrips, *Thrips tabaci*, on onions and against cyclamen mite, *Tarsonemus pallidus*, on strawberries.

Asparagus.

1524. Sneep, J.
The significance of andromonoecism for the breeding of *Asparagus officinalis* L. II.
Euphytica, 1953, **2**: 224-8, bibl. 3.

A breeding programme designed to produce male plants only was outlined in a previous paper [*H.A.*, 23: 4181]. The difficulties in the way of executing the programme are now examined more closely.

1525. Nisen, A.
Semis et plantation de l'asperge. Comment améliorer le rendement des cultures. **(Sowing and planting asparagus. How to increase yields.)**
Courr. hort., 1954, **16**: 19-26, bibl. 11, illus.

The writer discusses spacing and depth of planting of crowns, the life of a bed, whether to plant 1- or 2-year-old crowns and the importance of differentiating between male and female crowns, selection of seed and the effect of length of harvest on yield. The chief conclusions are that, under Belgian conditions, 25 cm. appears to be the optimum planting depth; 1-year-old crowns are preferable to 2-year-old and male to female; the length of harvest should be not more than 8 weeks for a bed in full production, and 2 and 4 weeks respectively for beds in their second and third years after planting.

Brassicas.

(*See also* 1314, 1506, 1513, 1514, 1611, 1647b, 1648a, e.)

1526. Zlatkovský, A.
Zkušenosti s pěstováním květáku na semeno ve volné půdě podle sovětských metod. **(Experiments on growing cauliflower for seed in the open by Soviet methods.)** [Russian summary.]
Sborn. čsl. Akad. zeměd. Věd, Ser. A, 1953, **26**: 333-46, bibl. 12, illus.

Trials conducted in 1952 at Troja near Prague have shown that, by applying the "Soviet" method of cultivation, which includes shading, irrigation, provision of bees, pest and disease control and staking, cauliflower seed can be produced on a large scale in Czechoslovakia. Best results were obtained with plants raised in frames in the spring. In the experiment described a spacing of 70×70 cm. was used, but the possibilities of other spacing treatments are discussed.

1527. Moss, N., and Wright, W. J.
Report of the vegetable department at Luddington.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 23-8.

Notes are given on the work at the Station with special reference to investigations undertaken in collaboration with other organizations such as the National Institutes of Agricultural Botany and Engineering (N.I.A.B. and N.I.A.E.). Results obtained in the National Vegetable Trials, organized by the N.I.A.B., with brussels sprouts, cabbage, savoy, cauliflower and broccoli are given.

1528. Walker, J. C., Larson, R. H., and Pound, G. S.
Badger Market, a new disease resistant cabbage.
Phytopathology, 1953, **43**: 649-50, illus.

A round-head, second-early cabbage highly resistant to yellows and moderately resistant to mosaic.

1529. Hahn, P.
Der Einfluss der Aussaat- und Pflanzzeit auf den Ertrag bei Spätweisskohl. **(The effect of sowing and transplanting dates on yields of late cabbage.)**
Arch. Gartenb., 1953, **1**: 223-8.

In trials with several late cabbage varieties the earliest of two sowing and transplanting dates produced the highest yields and the best quality.—Sortenamt Nossen.

1530. Hayashi, K., Kondô, H., and Mizuno, T.
Biochemical studies on seed-stalk development in cabbages. [Japanese, with English summary.]
J. agric. chem. Soc. Japan, 1952, **25**: 533-4, from abstr. in *Biol. Abstr., Sect. D*, 1953, **27**, No. 30674.

Flowering and heading cabbages were analysed for ash, sugars and N. The carbohydrate/N ratio of flowering and heading samples respectively was:—upper leaves 8·4 and 12·5, lower leaves 8·0 and 7·8, total leaves 8·2 and 10·1, upper stem 12·1 and 7·8, lower stem 12·0 and 9·5, and total stem 11·8 and 8·4.

1531. Fajardo, P. S.
Pechay growing.
Philipp. Agric., 1952, **36**: 218-24, illus.

Pechay or Chinese cabbage (*Brassica pekinensis*) is an annual salad vegetable much grown in the Philippines. Yields are about 9,000–10,000 kg. per ha. for both the heading and open varieties. Notes are given on environmental conditions, cultural practices, harvesting and preparation for market.

1532. Somos, A.
Télikáposztával végzett állománysűrűségi vizsgálatok eredményei. **(Results of winter cabbage spacing trials.)** [English, German and Russian summaries 1½ pp. each.]
Növényterm, 1953, **2**: 165-9+foreign summaries, bibl. 4.

In experiments extending over two years with the cabbage variety Balinkai, the highest yield combined with the lowest production cost was obtained when the plants were spaced at 40×50 cm. The proportion of edible parts at this spacing amounted to 31·5% of the total yield; closer planting resulted in a higher percentage of waste.

1533. Moss, N., and Wright, W. J.
Crop spacing experiments.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 36-9.

Spacing experiments with asparagus are designed to ascertain the optimum planting distances for the crop and to compare the productivity of beds of unsexed plants with that of beds of male plants. The object of onion spacing experiments is to obtain information on yields when the spacing between the rows and in the rows is varied, and thereby help to standardize crop widths so that machinery used in their cultivation may be simplified. Results are tabulated. Although in the trial described the best spacing for Cambridge Drumhead cabbage was 24×12 in., it appeared that under better growing conditions, one of 24×18 in. would be better.

1534. Somos, A.
Karfiollal végzett állománysűrűségi vizsgálatok eredményei. **(Results of cauliflower spacing trials.)** [English, German and Russian summaries 1 p. each.]
Növényterm, 1953, **2**: 165-9+foreign summaries, bibl. 4.

Results of 3-years trials have shown that the growing period of the cauliflower variety Erfurt Dwarf varies from 170 to 190 days and that a spacing of 40×50 cm. is most suitable for this variety. The edible curd represented 24–26% of the total crop irrespective of spacing treatments.

1535. Casarini, B.
Effetti del freddo invernale sulle foglie di cavolfiore. **(Effects of frost on cauliflower leaves.)** [English summary 4 lines.]
Riv. Ortoflorofruttic. ital., 1953, **37**: 475-7, bibl. 4, illus.

The symptoms were a slight curling of the leaves with wrinkling on the upper surface and separation of the lower epidermis from the mesophyll.

1536. Eddins, A. H.
Diseases, deficiencies and injuries of cabbage and other crucifers in Florida.
Bull. Fla agric. Exp. Stats **492,** 1952, pp. 63, bibl. 30, illus.

The following major diseases of cabbage, cauliflower and some other brassicas are described and illustrated (pp. 6-36): Alternaria leaf spot caused by *Alternaria oleracea* and to a lesser extent by *A. brassicae*, bacterial soft rot (*Erwinia carotovora*), black rot (*Xanthomonas campestris*), damping-off (*Pythium* sp.), downy mildew (*Peronospora parasitica*), rhizoctoniose (*Rhizoctonia solani*), sclerotiniose (*Sclerotinia sclerotiorum*), and yellows (*Fusarium oxysporum* f. *conglutinans*). Seven minor diseases, nutritional deficiencies and injuries—including drought injury, spray damage, bolting and eelworms—are also discussed.

1537. Moss, N., and Garthwaite, J. M.
Pathological experiments at Luddington.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 40-8, illus.

Cauliflower mosaic: The spread of the disease in 1951/52 and 1952/53 is recorded, and preliminary comments, prior to a full report, are given. *Cabbage root fly:* In 2 experiments with the summer cauliflower variety Driancourt and autumn variety Majestic, 4% calomel dust, 0·45% γ BHC dust, 0·01% γ BHC suspension and 0·1% chlordane emulsion were applied for cabbage root fly [*Erioischia brassicae*] control. In the first test with the early variety, the total weight of marketable heads from the treated plants was significantly higher than that from the controls. There was no significant difference as between the treatments. With the autumn cauliflower there was a similar response, except that the calomel treatment failed to produce a significant increase over the control. *Botrytis cinerea control in winter lettuce by cultural and chemical methods:* From results obtained it is concluded that the most satisfactory method of growing winter lettuce was to raise the seedlings under glass and to plant out in early spring. Applications of tetrachlornitrobenzene gave control of *Botrytis* infection and reduced losses slightly.

1538. Quarrell, C. P.
Whiptail and blindness in cauliflowers.
Grower, 1953, **40**: 1099.

Cauliflower plants, all raised from the same seed packet under the same conditions, were planted out in different fields. Those planted in a soil of pH 7·23 showed no whiptail symptoms while those planted in a soil of pH 6·4 were nearly all affected. In a third field, where 25% of the plants were affected, the soil under the whiptail plants gave a reading of pH 6·25 and under the good plants of pH 7·18. This is in accordance with

the theory that plants fail to take up sufficient molybdenum on acid soils. Preliminary tests suggest that the use of the normal dose of molybdenum for seed beds (1 oz. sodium molybdate in 2 gal. water per 10 sq. yd.) is too strong when applied to plants in pots, and may check their growth.

1539. Croxall, H. E., Gwynne, D. C., and Broadbent, L.
Turnip yellow mosaic in broccoli.
Plant Path., 1953, **2**: 122-3, illus.

Turnip yellow mosaic in broccoli was widespread in north-east England at the end of 1952. St. George, Midsummer, Whitsuntide, May Blossom, Pearl, Lenton Monarch, Hardy Late and Gigantic were the varieties affected.

1540. Smith, M. A., and Ramsey, G. B.
Bacterial spot of broccoli.
Phytopathology, 1953, **43**: 583-4, bibl. 2, illus.

The symptoms are described of a bacterial spot observed in broccoli from Oceano, California. Tests suggest that the pathogen is *Pseudomonas maculicola*.—Univ. Chicago.

1541. Colhoun, J.
Observations on the incidence of club-root disease of brassicae in limed soils in relation to temperature.
Ann. appl. Biol., 1953, **40**: 639-44, bibl. 1.

Cabbage plants grown on artificially contaminated, heavily limed soil developed very severe attacks of club root (*Plasmodiophora brassicae*) when grown in a greenhouse at a mean temperature of 23° C. When grown in the greenhouse for 6 days and then transferred to an open-air verandah with a mean air temperature of 16° C., severe attacks developed. When transferred after 12 days in the greenhouse to a verandah with mean temperature not exceeding 12·5° C., only slight attacks developed. All plants were healthy when verandah temperatures only were used. J.S.

1542. Miles, M.
Field studies on the influence of weather conditions on egg-laying by the cabbage root fly, *Erioischia brassicae* Bché. I.
Ann. appl. Biol., 1953, **40**: 717-25, bibl. 6.

Studies at Wye College during 1952 showed that infestation by *E. brassicae* as measured by egg-laying was heaviest in spring, only slight at midsummer when the second generation was active and negligible from mid-July onwards. The onset of attack in spring was encouraged by warm, sunny weather; it developed rapidly and continued for about 3 weeks. The pattern of attack showed that control measures, to be most effective, should be applied at the beginning of the egg-laying period. In summer, showery weather favours attack, but it also favours the establishment of newly set plants, and observations suggest that in S.E. England protective measures should only occasionally be necessary.

1543. Wright, D. W.
Cabbage root fly on summer cauliflower.
Grower, 1954, **41**: 293-9, illus.

Extensive trials carried out at the National Vegetable Research Station, Wellesbourne, have shown that cabbage root fly attack can be successfully prevented on cauliflowers by watering the seedlings in pots with an insecticidal solution shortly before planting out in the field. A 0·04% suspension of gamma BHC, a 0·05% emulsion of aldrin or a 0·2% emulsion of chlordane, all applied at the rate of $\frac{1}{16}$ pint per plant, have given excellent results and have increased the number of marketable heads and the size of heads and reduced the looseness of the curds. For plants raised in nursery beds it is recommended that the insecticide should be applied after the plants have been set out in the field. The following materials applied at the rate of $\frac{1}{8}$ pint per plant have given good results: 0·02% gamma BHC suspension, 0·05% aldrin emulsion, 0·1% chlordane emulsion and 0·025% parathion emulsion. Dusts give less complete control of the pest. In southern England crops should be treated during the third week of April, or, if planted later, within 3 days of planting.

1544. Ahlberg, O.
Fortsatta bekämpningsförsök mot kålflugor och morotfluga. (**Further experiments on the control of the cabbage root fly and the carrot fly.**)
Växtskyddsnotiser, 1953, No. 5/6, pp. 68-74, illus.

In trials, carried out for 3 years in several localities, with lindane, chlordane and dieldrin, applied in different ways, the cabbage root fly on cauliflower and cabbage was most successfully controlled by watering at planting and 2–3 weeks later with a 0·4–0·5% solution of a chlordane preparation (Oktatox). The same treatment gave the best results also against carrot fly, though conclusive data are available for one year only. In one preliminary experiment on onion fly control a slurry of lindane and clay placed in the planting hole proved superior to watering with chlordane.

1545. Rosborough, T.
Control of turnip gall weevil on cabbage.
Plant Path., 1953, **2**: 123-5, bibl. 2.

In trials carried out in 1951/52 gall weevil, *Ceutorrhynchus pleurostigma*, on spring cabbage was effectively controlled in the seed-bed by dusting with 2% BHC dust applied when the second pair of rough leaves had formed. Good control on older plants of spring, summer and winter cabbage was obtained by applying 2% BHC dust to the base of the plants at the rate of 1 lb. per 160 plants, three days after transplanting.—Royal agric. Coll., Cirencester.

Celery.

(*See also* 1509, 1647v, 1648h.)

1546. Spencer, E. L., and Geraldson, C. M.
Symptoms of nutritional disorders of vegetable crop plants. Black-heart of celery.
A.R. Fla agric. Exp. Stats 1951/52, p. 241.

In field and greenhouse celery plants black-heart tissue was found to be relatively low in Ca. In greenhouse plants with severe black-heart new growth appeared 2–3 days after the crowns were sprinkled with either calcium nitrate or calcium chloride, but not when Mg or K salts were applied. About 8–10 days after Ca treatment had been discontinued, however, black-heart again began to develop. As these plants were grown in a nutrient solution containing 150 p.p.m. Ca it would

appear that black-heart may be due to a faulty balance in the plant between Ca and one or more of the other essential cations.

1547. Swank, G., Jr.
Control of celery seedbed diseases by soil fumigation.
Proc. Soil Sci. Soc. Fla 1952, **12**: 48-53, bibl. 11, being *J. Ser. Fla agric. Exp. Stat.* **126.**

Damping-off fungi (*Rhizoctonia*, *Pythium*, *Fusarium* and *Sclerotium* spp.) and nematodes (mainly *Meloidogyne* and *Trichodorus* spp.) do serious damage in celery seed beds in Florida. Methyl bromide, dibromobutene and chlorobromopropene have given satisfactory control of both types of organism. Experience gained in methods of applying these and other less satisfactory soil fumigants is outlined. [See also *H.A.*, 23: 4209.]

1548. Anon.
Progress in control of carrot fly.
Comm. Gr, 1954, No. 3031, p. 182.

Results are reported of trials made over the last 3 years by the Yorkshire and Lancashire N.A.A.S. with lindane for the control of carrot fly in celery. It was found that a drench made up of $\frac{1}{3}$ oz. of 25% lindane wettable powder in 1 gal. water, applied at the rate of $\frac{1}{4}$ pint around each plant after planting out, gave excellent control, and produced heavier and better quality plants. The method, however, is laborious and requires large quantities of water. Lindane spray and lindane dip treatments both gave very good control of carrot fly. The dip had the more favourable effect on weight and quality although it was not so good in this respect as the drench. From the economic point of view, the dip treatment is recommended, in which the roots and lower foliage are dipped in a suspension of 4 oz. 25% lindane in $1\frac{1}{4}$ pints water before planting. The work is being continued. [See also Abstract 1607.]

1549. Oostenbrink, M.
Schade bij selderie door ectoparasitaire wortelaaltjes van het geslacht *Paratylenchus* Micoletzki 1922. **(Damage to celery by ectoparasitic root eelworms of the genus *Paratylenchus*.)** [English summary $\frac{1}{2}$ p.]
Jaarb. PlZiekt. Dienst Wageningen 1951/52, 1953, pp. 175-8, bibl. 8, being *Meded.* **120,** illus.

The failure of a celery crop at Tegelen, Holland, in 1952 was found to be due to attack by the parasitic root eelworm, *Paratylenchus* sp. The symptoms of damage, including chlorosis, stunted root development and root lesions, are described. Observations are made on the biology of the eelworm. Damage by ectoparasitic eelworms has not previously been recognized in Holland.

Cucurbits.

(*See also* 1506, 1509, 1632, 1647f, j, t, x, 1698.)

1550. Vinnik, A. G., and Vetušnjak, L. F.
Intervarietal hybridization of cucumber. [Russian.]
Agrobiologija, 1952, No. 4, pp. 125-31.

Trials conducted at Kharkov in 1949–1951 on intervarietal hybridization of 2 cucumber varieties with various pollinators are described. The results show that the hybrid plants produced more, better quality and earlier fruits than the parents.

1551. Koblic, J.
Okurky, jejich složení a význam pro výživu. I. Okurky nakládačky a jejich ústrojne součásti. II. Okurky nakládačky a jejich neústrojné součásti se zřetelem na jejich t. zv. zásadotvornost. **(Cucumbers, their composition and importance in nutrition. I Pickling cucumbers and their organic components. II. Pickling cucumbers and their inorganic components with special reference to their so-called excessive alkalinity.)** [Russian and German summaries.]
Sborn. čsl. Akad. zeměd. Věd, Ser. A, 1953, **26**: 363-70, 447-54, bibl. 20.

Pickling cucumbers from the 2 most important producing centres, Kutná Hora in Bohemia and Znojmo in Moravia were analysed and the results tabulated. Chemical composition, loss of weight during the 24 hours following harvest, digestibility and calorific value are considered.

1552. Harcourt, D. G.
Note on injury to cucumber by the tarnished plant bug, *Lygus lineolaris* P. de B. (Hemiptera: Miridae).
Canad. Ent., 1953, **85**: 421, bibl. 1, illus.

Adults attacked young cucumber plants near Ottawa in July 1952. Only one previous published reference to cucumber attack was found.

1553. Palti, J.
Field observations on the humidity relationships of two powdery mildews in Israel.
Palestine J. Bot. (*R*), 1953, **8**: 205-15, bibl. 10.

The occurrence of powdery mildew diseases (*Oidium* sp.) on potatoes and cucumbers was studied in relation to local climatic factors. The cucumber mildew is thought to be influenced primarily by the age of the plants and cultural or irrigation factors, since development could not be related to any definite level of humidity, nor severity to mean monthly temperature.

1554. Bravenboer, L.
Methodiek voor de beproeving van bestrijdingsmiddelen tegen *Cladosporium cucumerinum* bij komkommers. **(Methods of testing fungicides for control of *Cladosporium cucumerinum* of cucumbers.)** [English and German summaries $\frac{1}{2}$ p. each.]
Reprinted from *Meded. LandbHogesch. Gent*, 1953, **18**: 374-84, illus., as *Publ. Proefstat. Groent. Fruit. Glas Naaldwijk* **41,** fl. 0.50.

The results of field application of fungicides for control of *Cladosporium cucumerinum* are compared with the results of 6 laboratory test methods, namely the direct effect of the fungicide and the effect of its vapour on growth of the mycelium, on germination of the spores and on inoculated young plants. None of these methods proved a reliable criterion for the effect of the fungicides in practice, but it is considered that, if both the fungicide itself and its vapour had a favourable

effect on inoculated young plants, it would probably prove satisfactory in the field.

1555. Pramer, D.
Observations on the uptake and translocation of five actinomycete antibiotics by cucumber seedlings.
Ann. appl. Biol., 1953, **40**: 617-22, bibl. 13, illus.

Streptomycin and chloromycetin were absorbed by cucumber roots from a nutrient solution and translocated to the leaves. The concentration of the former in the leaf tissue eventually increased to a level above that in the nutrient solution. The concentration of the latter remained below that in the nutrient solution. There was no evidence of uptake and translocation of aureomycin, neomycin or terramycin. J.S.

1556. Masuda, T., and Kodera, M.
Studies on cultivation of the melon (*Cucumis melo* L.). II. On the development of fruits. [Japanese, with English summary 8 lines.]
Sci. Rep. Fac. Agric. Okayama Univ. **2**, 1953, pp. 38-43, bibl. 7.

Increase in diameter, weight and pulp thickness were most rapid within 30 days from flowering. Reducing sugar content of the pulp was nearly constant during development. Non-reducing sugars appeared about 30 days after flowering and increased rapidly until harvest.

1557. Tkačenko, F. A.
Variability in the development of the root system of watermelon varieties and hybrids. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **91**: 1397-1400.

Hybrid watermelons produced not only heavier top growth, including higher yields, than the original parent varieties, but also more vigorous root systems. Root measurements made in the Ukraine in 1950 and 1952 on parent varieties and F_1 hybrids are tabulated and the principle of increased production by hybrid plants is very briefly recapitulated.

1558. Mehrotra, B. S.
The cottony leak of *Citrullus fistulosus* fruits.
Lloydia, 1953, **16**: 157-61, bibl. 5, illus.

The occasional occurrence of cottony leak (*Pythium aphanidermatum*) in *Citrullus fistulosus* fruits is reported for the first time in India. Infection is presumed to occur in transit and storage; proper handling and the removal of diseased fruits in storage are recommended. —Univ. Allahabad.

Legumes.

(*See also* 1115, 1117, 1419, 1431, 1506, 1507, 1509, 1510, 1513, 1647i, m, s, w, 1648d, i.)

1559. Wainstein, P.
Estudios comparativos sobre variedades de poroto. **(Bean variety trials.)**
Idia, 1953, No. 67, pp. 22-4, bibl. 3.

Bean variety trials were conducted in 1948/53 at La Consulta Experimental Substation in Mendoza Province. Idaho Refugee and other North American dwarf french beans showed good qualities. Among butter beans Florida Butter lima gave good yields. The local scarlet runner is of good quality.

1560. Bousard, M.
De proeven met de nieuwe bonenvarieteit "Wade". **(Trials with the new bean variety Wade.)**
Cult. Hand., 1954, **20**: 17.

Tests of the new French bean variety Wade at two places in east Flanders have shown that it is a quick-growing, vigorous variety with tender, well-flavoured beans. The stems are brittle and break off rather easily. It appeared to be very healthy. A spacing of 65×65 cm. is recommended.

1561. Wainstein, P.
Estudio comparativo sobre variedades de arveja. **(Pea variety trials.)**
Idia, 1953, No. 63, pp. 16-24, bibl. 8, illus.

Trials were carried out with 70 dwarf, semi-dwarf and climbing pea varieties (U.S.A. and local) at La Consulta in Mendoza Province, Argentina, during 1948–51. Cultural notes are given and the names are listed of varieties which proved suitable for fresh consumption, for canning and for drying.

1562. Polunin, Ja. Ja.
New vegetative hybrids of processing pea. [Russian.]
Agrobiologija, 1951, No. 4, pp. 111-15, bibl. 1, illus.

In continuation of earlier trials [see *H.A.*, 21: 1643] observations were made on the first seed generations of vegetative grafts of processing peas. It appears that changes in size and colour of the seed occurred more frequently than changes in pod and plant characters. The yield of the vegetative hybrids was higher than of the parent varieties, suggesting that the effect of grafting is comparable to that of cross-pollination.

1563. Kujala, V.
Felderbse, bei welcher die ganze Blattspreite in Ranken umgewandelt ist. **(A leaf mutation in pea.)**
Arch. Soc. zool. bot. Fenn. "Vanamo", 1953, **8**: 44-5, bibl. 1, illus.

A rare mutation in pea is described, namely the transformation of the laminae into tendrils. Seed harvested from the affected plant reproduced the mutant type.

1564. Morris, G. P.
Investigations into the use of the first two leaves of pea seedlings in varietal identification.
J. nat. Inst. agric. Bot., 1953, **6**: 489-93, bibl. 1, illus.

Following the publication of the paper by van der Vaart [abstracted in *H.A.*, 23: 1878] a preliminary examination was made of the scales of the second node of seedlings of several types and many varieties in a collection of peas. This was followed by a controlled experiment in the 1953 season to examine the possibilities of using the leaf scales of seedling peas as aids to identification. Forty samples were sown in pots in a greenhouse, and the leaf scales produced at the two lowest nodes were kept under observation and later removed from the seedlings and mounted in rows on gummed paper for further detailed examination and photographs to be taken of them. As a result of the

examination a considerable range of characteristic differences was found to exist not merely as between types but also between varieties in the types, and it appeared that these differences were such as could often effectively assist in varietal identification. [From author's summary.]

1565. Trébuchet, G., Chopinet, R., and Drouzy, J.
Contribution à l'étude des variétés de pois potager cultivées en France. (**Contribution to the study of the pea varieties grown in France.**)
Ann. Amél. Plantes, 1953, **3**: 147-251, illus.

This detailed paper includes an outline of the botany of the genus *Pisum*, notes on vegetative, morphological and physiological characters, and a key to, and description of, varieties.

1566. Fourmont, R., and Brossier, J.
Quelques caractères floraux chez le pois cultivé. (**Some floral characters of the cultivated pea.**)
Ann. Amél. Plantes, 1953, **3**: 253-73, bibl. 9, illus.

This paper consists of a detailed description of the floral characters of the pea and a key to the chief varieties based on these characters.

1567. Laumont, P., and Chevassus, A.
Note sur la lentille large verte d'Algérie. (**Note on the large green lentil of Algeria.**)
Rev. hort. Algér., 1953, **57**: 274-82, bibl. 7.

The large green lentil of Algeria is a natural hybrid between the small green lentil of Puy (*Lens esculenta* subspecies *microsperma* var. *dupuyensis*) and the large Chilean yellow lentil (*Lens esculenta* subspecies *macrosperma* var. *nummularia*). Selection and breeding are in progress with a view to the replacement of the small green by the large green lentil which has larger seeds and a wider zone of cultivation, and should be able to enter the metropolitan market without competing with French-grown small green lentils. Notes are given on the botany, taxonomy, selection and breeding of the large green lentil and on varietal, yield and spacing trials.

1568. Dormer, K. J.
Observations on the symmetry of the shoot in *Vicia faba* and some allied species, and on the transmission of some morphogenetic impulses.
Ann. Bot. Lond., 1954, **18**: 55-70, illus.

Axillary buds occur [in *Vicia faba*, *Pisum sativum* and *Cicer arietinum*] in unsymmetrical arrangements so that any node must be either right- or left-handed. The two types occur in roughly equal numbers but are not randomly distributed. The condition of any node is determined partly by stimuli transmitted from the nodes below. The tissues of the stem can act as a filter, transmitting right- and left-handed stimuli with different degrees of efficiency. Although there are considerable interspecific differences in respect of these relationships, it is unlikely that the actual state of right- or left-handedness of a node is subject to any direct genetical control. In this respect the bud arrangements resemble phyllotactic spirals and differ from most other right- or left-handed structures occurring in plants. [Author's abstract.]—Univ. Manchester.

1569. Newton, W.
Seed germination and seedling growth as influenced by different kinds of sawdusts.
Canad. J. agric. Sci., 1953, **33**: 593-6, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa* **1267.**

Seed germination and subsequent seedling growth of garden peas, beans, and sweet peas was greatly depressed when the seed was planted in pure cedar (*Thuja plicata*) sawdust as compared with soil, but little or no depression occurred when the seed was planted in fir (*Pseudotsuga taxifolia*), hemlock (*Tsuga heterophylla*), and balsam (*Abies grandis*) sawdusts. Balsam slightly accentuated the growth of beans and sweet peas. The incorporation of all four sawdusts at 20% and 30% by volume with soil depressed the germination of radish and subsequent seedling growth as compared with soil alone. These effects were particularly marked with cedar sawdust. Balsam sawdust caused the least and fir the greatest depression in the germination of radish seed, whereas fir sawdust caused the least and balsam the greatest depression in subsequent seedling growth. An explanation of this inverse relationship is presented. [Author's abstract.]

1570. Schmidt, H.-H.
Die Keimung überlagerter Erbsensorten. (**The germination of pea varieties stored for a long period.**)
Saatgut-Wirtsch., 1953, **5**: 279-82, bibl. 18, illus.

Marrow-fat peas imported from the United States in 1948 and 1949 showed many abnormalities in germination tests carried out in 1953. These abnormalities are here discussed.—Staatsinst. angew. Bot., Hamburg.

1571. Márkus, L., and Bártfay, T.
A nitrogén megoszlása és az aminosav összetétel megváltozása a fejlődő borsómagban. (**Distribution of nitrogen and changes in the amino acid composition of the developing seeds of pea.**) [English, German and Russian summaries 1½ pp. each.]
Növényterm., 1953, **2**: 117-23+foreign summaries, bibl. 3, illus.

Examinations were made of the pea variety Little Marvel during 4 phases of its development. From the study of the nitrogen fractions it was established that the greatest weight increase of the seeds occurring in the 3rd phase coincided with a large nitrogen accumulation, which in turn was followed by increased protein synthesis in phase 4. Twenty-three free amino acids were determined, in both pod and seed, by paper chromatography. Those found in largest quantities were: glutamine, glutamic acid, leucin, and alanine.

1572. Temme, J., and van der Marel, H. W.
Kaliumfixatie en verstoorde kaliumhuishouding. (**Potassium fixation and disturbed potassium condition.**) [English summary 1¼ pp.]
Versl. landbouwk. Onderz. **58.6,** 1952, pp. 53, bibl. 39, illus.

This study of potassium fixation is mainly concerned with soil problems and the responses of agricultural crops. With regard to horticultural crops, however, it is suggested that the ill effects of potassium fixation

on sensitive crops such as field beans may be partially overcome by the addition of potassium fertilizers mixed with peat, which has a high adsorption capacity. The use of oats as a green manure crop in orchards on potassium-fixing soils is also suggested, as this crop has a high extracting power for potassium.

1573. Speer, R. J., and others.
Phosphate fertilizers for the Texas blacklands: I. Relative availability of various phosphatic fertilizers.
Allen, S. E., Speer, R. J., and Maloney, M.
Idem: II. Utilization of phosphate as influenced by plant species and by placement and time of application.
Soil Sci., 1951, **72**: 459-64, bibl. 10, and 1954, **77**: 65-73, bibl. 7.

The availability of 11 different P^{32}-labelled phosphatic fertilizers to Black Valentine string beans on highly calcareous Houston black clay was compared in greenhouse pot experiments at the Texas Research Foundation. The utilization of the water-soluble forms by beans was also studied.

1574. Chibnall, A. C.
Protein metabolism in rooted runner-bean leaves.
New Phytol., 1954, **53**: 31-7, bibl. 7.

When a mature leaf of the runner bean is detached from the plant and kept with the cut end of the petiole in water or mounted in moist sand there is a rapid breakdown of protein in the blade, accompanied by an overflow of non-protein nitrogen into the petiole. Chloroplast degeneration occurs within a few days. Treatment with indolylacetic acid brings about the development of adventitious roots on the petiole, under these conditions the rate of protein breakdown in the blade is much reduced and the rooted leaf will survive for many weeks. The bearing that these observations have on the concept of a protein cycle in leaves is discussed. [Author's summary.]

1575. Chibnall, A. C., and Wiltshire, G. H.
A study with isotopic nitrogen of protein metabolism in detached runner-bean leaves.
New Phytol., 1954, **53**: 38-43, bibl. 12.

Detached leaves of the runner bean have been kept for 4 days in the dark with the petiole immersed in a solution of ammonium chloride containing isotopic nitrogen. As was expected, considerable protein breakdown occurred in the blades during this period. The residual protein of the blades was extracted, and on analysis was found to contain isotopic nitrogen. The lysine isolated from the hydrolysis products of the residual blade protein was found to contain isotopic nitrogen in both its amino groups. The results are considered to provide evidence for the occurrence of a protein cycle in leaves, protein synthesis being maintained in spite of conditions which enhance the rate of protein decomposition. [Authors' summary.]

1576. Audus, L. J., and Garrard, A.
Studies on the growth and respiration of roots. I. The effects of stimulatory and inhibitory concentrations of β-indolylacetic acid on root sections of *Pisum sativum*.
J. exp. Bot., 1953, **4**: 330-48, bibl. 12.

Simultaneous observations on extension growth and respiration rate (oxygen consumption) of 2-mm. sections excised from the extension zone of roots of pea growing in distilled water and 0·5% sucrose have yielded results closely similar to those of Brown and Sutcliffe [*H.A.*, 20: 1242]. A typical growth response to β-indolylacetic acid (IAA) was obtained, with a maximum stimulation (of about 35%) at 1 part in 10^{11} and inhibitions increasing progressively with concentration beyond the threshold of about 1 part in 10^{9}. Both percentage stimulation and percentage inhibition of growth were independent of the presence of sucrose. Respiratory responses to IAA were complex. It is concluded that IAA in both growth-stimulatory and growth-inhibitory concentrations has no *direct* effect on the activity of the respiratory enzyme system of growth root cells. The small respiratory responses are best explained as resulting from differential changes in section size and correlated changes in the enzyme complements of the growing cell. [From authors' summary.]

1577. Brewer, D., and MacNeill, B. H.
Preliminary studies in *Ascochyta pisi* Lib.
Canad. J. Bot., 1953, **31**: 739-44, bibl. 9.

A study on the nature of resistance in pea varieties to foliage infection by the blight organism, *Ascochyta pisi*, suggests that resistance may be due to some factor associated with the cuticle which prevents penetration by the fungus or to a physiological factor that is effective immediately after penetration of the cuticle. One or both factors may be operative in the immune variety A-100, but only the second in the semi-resistant variety O.A.C. 181. Studies are also reported on the cytology of the pathogen.—Dep. Bot., Ontario agric. Coll., Guelph.

1578. Zachos, D. G.
Un cas d'attaque du pois par le *Cylindrosporium pisi* Berger. **(A case of *Cylindrosporium pisi* attack on pea.)**
Ann. Inst. phytopath. Benaki, 1952, **6**: 79-80, bibl. 1, illus.

Cylindrosporium pisi was recorded on pea for the first time in Greece in 1953. It was associated with *Ascochyta pisi* and may be a secondary fungus attacking plants enfeebled by the latter.

1579. Radha, K.
The enzymic activity of *Macrophomina phaseoli* (Maubl.), Ashby.
Proc. Indian Acad. Sci. Sect. B, 1953, **38**: 231-4, bibl. 3.

Due to pectolytic enzyme activity of the pathogen, the pectin content of french bean plants infected with *Macrophomina phaseoli* was 50% less than that of healthy plants.

1580. Watson, R. D.
Control of root rot by row application of soil fumigants.
From abstr. in *Phytopathology*, 1953, **43**: 590.

Early root rot infections are generally concentrated near the cotyledonary node of peas and the transition zone between root and hypocotyl on beans. This observation suggested that fungicidal fumigants placed

at the proper level when the seed was planted might offer effective control. This assumes the fumigant will be non-toxic to the seed or volatile enough to be dissipated before the seed starts to grow and becomes more sensitive to the fumigants. The 2 fumigants tested gave excellent control of root rot in greenhouse and field tests for 2 years. Control with Shell CBP-55 was more consistent than with formaldehyde. Control of root rot was accompanied by improved stands and marked increases in yield of peas and beans. Application equipment was developed which was both simple to make and easily adapted to most planters.

1581. Brindley, T. A., and Schopp, R.
Tests with aerosols for control of the pea aphid.
J. econ. Ent., 1953, **46**: 689-90, bibl. 4, illus.

In trials in Idaho and Oregon there was little difference in effectiveness between DDT dust, DDT aerosol and TEPP aerosol for the control of pea aphid, *Macrosiphum pisi*. All the aerosol treatments, notably that with TEPP, caused some plant injury.

1582. Ditman, L. P., Kramer, A., and Saulsbury, A. O., Jr.
Performance of malathon for control of the pea aphid.
J. econ. Ent., 1953, **46**: 645-8, bibl. 6, being *Sci. Pap. Md Exp. Stat.* **A396.**

In Maryland, commercial ground spraying with 1·5 pt. of 50% emulsifiable malathon in 25 gal. water per acre applied with a boom sprayer gave very good control of aphids [*Macrosiphum pisi*]. Under favourable weather conditions aeroplane application of a concentrated spray gave results comparable to ground spraying. No residues of malathon were detected on pea vines or on canned peas when the treatment was applied slightly over 2 weeks before harvest.

1583. Wageningen, Plantenziektenkundige Dienst.
Zaadbehandeling van stambonen tegen de bonenvlieg, *Chortophila cilicrura* Rond. **(Seed treatment of runner beans for control of bean seed fly.)**
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, p. 29, being *Meded.* **120.**

Treatment of runner bean seed with either 20% lindane dust or 25% BHC dust gave good control of bean seed fly. On the basis of the experimental results, 5 g. 20% lindane per kg. seed is recommended [see also *H.A.*, 23: 3100].

1584. van Dinther, J. B. M.
Biologie en bestrijding van de bonenvliegen *Hylemyia cana* Macq. en *Hylemyia liturata* Meig. **(Biology and control of the bean seed flies *H. cana* Macq. and *H. liturata* Meig.** [English summary 2¼ pp.]
Tijdschr. PlZiekt., 1953, **59**: 217-32, bibl. 13.

Information is given on the life histories, food plants and natural enemies of the bean seed flies, and on chemical control experiments carried out in Holland in 1951 and 1952. Seed dressings proved slightly better and less expensive than soil treatment with insecticides. No recommendations are as yet made on choice of chemical, and the experiments are to be continued.—Lab. Ent. Landbouwhoogesch., Wageningen.

1585. van der Vliet, M.
Waarnemingen over de levenswijze van de tuinbonenkever (*Bruchus rufimanus* Boh.) en proeven ter bestrijding van deze kever. **(Observations on the biology of the broad bean weevil (*Bruchus rufimanus* Boh.) and experiments on its control.)**
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 191-4, illus. being *Meded.* **120**

Experiments carried out since 1948 have not produced any completely satisfactory method for the control of the broad bean weevil. The percentage of seed infestation can be reduced, however, by spraying with DDT to control the weevils before oviposition, or by spraying with BHC-miscible oil or parathion after oviposition to destroy the eggs. In practice the latter method is the easier.

1586. Lynch, L. J., and Mitchell, R. S.
The definition and prediction of the optimal harvest time of pea canning crops.
Bull. C.S.I.R.O. Aust. **273,** 1953, pp. 43, bibl. 7, illus.

Crops of canning peas were studied in Tasmania and New South Wales during two successive seasons. Detailed measurements were made of changes in yield, maturity and size of peas and in vine weights, and the relation between yield and maturometer values was determined for each size grade at different stages in the development of the crop. Total yield increased with time over the sampling period, but the yield of first quality peas passed through a maximum when the maturometer value of ungraded peas (maturometer index) was 250 lb. The rate of change of maturometer index with time was about 20 lb./day, and predictions of the optimal harvest time were made on this basis. Such predictions were reliable to within 1 day when crops were sampled up to 4 days before the harvest time, when the maturometer index was approximately 170 lb. When yield and maturometer index were determined for small plots of known area within a commercial crop, a relation was found between these factors which enabled useful prediction to be made of crop yield at the optimal harvest time. [Authors' summary.] Four appendices cover the following subjects: data from trials described, calculation of yield of first quality peas, development of yield prediction equation, and long-term prediction of optimal harvest time.

1587. Kaniuga, Z.
Nowa metoda określania stopnia dojrzałości zielonego grochu na konserwy. **(A new method of estimating maturity in green canning peas.)** [English and Russian abstracts.]
Przem. roln. spoż., 1952, No. 8, pp. 307-12, illus., from abstr. in *Polish tech. Abstr.*, 1953, **2** (10), No. 2066.

An index of maturity has been evolved for canning pea varieties, based on the weight of 1,000 seeds and their starch and sugar contents. Thus 1,000 seeds of the variety Express at optimum maturity should weigh 170–210 g., Alaska 180–220 g., Delicate 350–390 g. and Lincoln 340–380 g.

Mushrooms.

(*See also* 1778.)

1588. GALBRAITH, W. S.
"Long" beds and short crops.
Bull. Mushroom Grs' Ass., 1954, No. 49, pp. 11-15.

The economics are discussed of cropping at various bed depths and working cycles ranging from 9 in. and 21 weeks to 4½ in. and 13 weeks.

1589. ALLERTON, F. W.
Peat and crushed chalk is the ideal casing.
Grower, 1954, **41**: 307.

As a casing medium for mushrooms it is recommended that thoroughly saturated sphagnum moss peat should be combined in equal quantities with crushed chalk, the chalk grading from 2-inch pieces to dust. This not only makes a mildly alkaline medium but leaves a rough surface from which evaporation will be high, thus increasing the temperature difference between the casing and the compost.

1590. FRASER, I. M.
The growth-promoting effect of indole-3-acetic acid on the common cultivated mushroom, *Psalliota hortensis* (Cooke) Lange forma *albida* Lange.
Aust. J. biol. Sci., 1953, **6**: 379-95, bibl. 47.

Indole-3-acetic acid (IAA) in concentrations of 5–100 mg./l. markedly increased the growth of a strain of cultivated mushroom floating on the surface of a liquid medium containing glucose, asparagine and mineral salts, particularly in the presence of thiamin and biotin which by themselves caused only a small increase in growth. IAA had little effect if the inoculum was submerged. The growth of both floating and submerged inocula was markedly increased by the addition of yeast extract, cotton wool extract or mushroom compost extract although these did not appear to contain appreciable quantities of IAA. This effect therefore appears to be due to an unidentified growth factor which may be necessary in addition to IAA. J.S.

1591. GREKOWICZ, M., BERGER, S., AND ŁUCZAKOWA, M.
Zawartość witaminy B_1, B_2, D i karotenu (prowitaminy A) w grzybach jadalnych. **(Vitamin B_1, B_2 and D and carotene contents of edible fungi.)** [English and Russian abstracts.]
Przem. roln. spoż., 1952, No. 10, pp. 379-84, from abstr. in *Polish tech. Abstr.*, 1953, **2** (10), No. 2055.

Boletus edulis, *Cantharellus cibarius* and *Tricholoma equestre* contain vitamins B_1, B_2 and D. The highest vitamin content was found in *Boletus edulis*, viz. 0·3–1 mg. % of vitamin B_1 and B_2 and 140 international units of vitamin D in 100 g. of fresh fungus. Provitamin A (carotene) was found only in *Cantharellus cibarius* at 0·5 mg. in 100 g. of fresh fungus.

Okra.

1592. SINGH, R. S.
Efficacy of bordeaux mixture and perenox in controlling leaf spot in bhindi [*Hibiscus esculentus*].
Sci. and Cult., 1953, **19**: 305-6.

Hibiscus esculentus leaves sometimes suffer seriously from the attacks of *Cercospora hibisci*, *Alternaria* sp., and *Phyllosticta* sp., and there is occasionally substantial yield loss and quality deterioration. Perenox (0·2 and 0·3%) and bordeaux mixture (2: 2: 50 and 4: 4: 50) both controlled the leaf spot. The infection rates for 4, 3, 2 and 1 sprays of the weaker preparation of each were nil, nil, 3·3 and 42% and 2·0, 4·7, 8·0 and 33% respectively compared with 80% in the control.

Onions and related crops.

(*See also* 1506, 1509, 1778.)

1593. ALEKSEEVA, M. V.
Some species of *Allium*. [Russian.]
Agrobiologija, 1952, No. 3, pp. 60-74, bibl. 11, illus.

A discussion supported by experimental data suggesting that the classification of garlic, *Allium sativum*, into bolting and non-bolting subspecies is erroneous and that *A. porrum* and *A. ampeloprasum* are a single species and should both be called *A. porrum*.

1594. PALILOV, N. A.
The effect of the size of sets on onion seed yields. [Russian.]
Sad i Ogorod, 1953, No. 11, pp. 36-9.

It is recommended that onion seed plants should be raised from selected small sets, since the practice is said to increase the yield of seeds by 25%. The best method of storing the onion sets is at 1–6° C. air temperature, with not more than 8–10° C. in the layer of onions.

1595. KALJTJA, A. JA.
Side dressing of onions. [Russian.]
Agrobiologija, 1952, No. 3, pp. 128-31.

Of 14 methods of NPK fertilizer treatments tried on onions grown from seed, PK applied before sowing and N when the first leaf appeared gave the highest yield (186·59 cwt. per ha.), with NP applied before sowing and K at the beginning of bulb formation second (185·51 cwt. per ha.). P supplied as superphosphate was found much more effective in granulated than in ordinary form.

1596. CIFERRI, R.
Inibizione della germogliazione di tuberi di patata e bulbi di cipolla a mezzo dell' idrazide maleica. **(Prevention of sprouting in potato and onion by the use of maleic hydrazide.)**
Humus, 1953, **9** (8): 13-14.

In tests in 1952 a thorough spraying of Maggiaiola onions with a 0·2% solution of the Na salt of maleic hydrazide plus a wetting agent, 6–10 days before harvest, completely inhibited sprouting during 8 months' storage in the dark at 15–20° C. (weight of sprouts nil compared with 18% of the total weight in the control). Spraying with a 3% solution of the triethanolamine salt at 1·5 ml. per onion had no inhibitory effect on sprouting.

1597. HENDERSON, D. M.
Virus yellows of shallots.
Plant Path., 1953, **2**: 130-3, bibl. 4, illus.

Spread experiments begun in 1949 and 1950 and concluded in 1951 showed that the plants adjacent to diseased ones are the most likely to become infected.

Spread was slight. In a loss of yield study recently infected plants yielded an average of 54·5 g. of bulbs compared with 91·9 g. in symptomless plants. Field observations suggested that progeny of infected plants are more severely affected each year.

1598. Larson, R. H., and Walker, J. C.
Thiram for smut control in onion set plantings.
Phytopathology, 1953, **43**: 596-7, bibl. 5.

Six years' experiments showed that onion smut (*Urocystis cepulae*) is effectively controlled on upland soil in Wisconsin by the application of $\frac{1}{10}$ lb. of thiram to 1 lb. of seed without sticker when approximately 70 lb. of seed per acre are used.

1599. Kirchner, H.-A.
Zwiebelfliegenbekämpfung durch Saatgutbehandlung. (**The control of onion fly by seed treatment.**)
NachrBl. dtsch. PflSchDienst, Berlin, 1953, **7**: 234-5, bibl. 4.

Onion seeds were shaken in cold, dilute potato paste to which later an insecticide was added. The coated seeds were then sown in a light sandy soil infested with onion fly. The effect of the treatment was compared with untreated controls and with two applications of liquid insecticides or dusts. The DDT preparation Spritzgesarol 50, the most effective of the compounds tested for coating, applied at the rate of 300 g. per 1 kg. seed, reduced infestation to less than 25% of that in the untreated control plots and proved slightly superior to watering or dusting during the growing season. Seed coating simplifies onion fly control, requiring no accurate timing for adequate protection.

1600. Merrill, L. G., Jr., and Hutson, R.
Maggots attacking Michigan onions.
J. econ. Ent., 1953, **46**: 678-80, bibl. 5, being *J. Art. Mich. agric. Exp. Stat.* **1484.**

Of the 6 or 7 important species found, *Hylemyia antiqua*, the onion maggot, caused most of the damage in Michigan-grown onions with *H. cilicrura* next. Maggots of lesser bulb flies, *Eumerus strigatus* and *E. tuberculatus*, were collected in large numbers in late July–August.

1601. (Gabelman, W. H.)
Don't use heat to cure onions.
A.R. Wis. agric. Exp. Stat. 1951/52, Part II, 1953, p. 34.

Asgrow 41, a poor storage onion, and Autumn Spice, a good storage onion, were cured for various lengths of time at 100° and 130° F. and then stored. On examination at the end of January it was found that heat treatment caused weight lósses ranging from 18 to 25% in Asgrow and 10 to 17% in Autumn Spice compared with losses of about 16% and 8% respectively in the same varieties cured in the usual way. Apart from the higher weight losses there was evidence suggesting that 130° F. for 20 to 24 hrs caused some internal breakdown.

Rhubarb.

1602. Vaughan, E. K., and Yale, J. W., Jr.
Ringspot-like viruses of rhubarb.
From abstr. in *Phytopathology*, 1953, **43**: 590.

The symptoms on rhubarb are described of ringspot-like viruses observed in Oregon. The viruses are transmissible to various plants by inoculation. The symptoms on Bountiful and broad bean are comparable to those of tomato ringspot viruses from cucumber.

Root crops.

(*See also* 1113, 1514, 1648f, g.)

1603. Baratte, J., and others.
Sur l'utilisation d'un ammonium quaternaire pour la désinfection des semences de betteraves et la lutte contre divers parasites de la betterave. (**Quaternary ammonium for beetroot seed disinfection and the control of certain beetroot parasites.**)
C.R. Acad. Agric. Fr., 1953, **39**: 793-5.

In glasshouse experiments the numbers of healthy plants per 100 seed balls previously inoculated with *Phoma betae* were 154 with 0·5% quaternary ammonium (diethyl dodecyl benzyl ammonium chloride), 136 with an organo-mercury product and 128 in the control. Against *Pythium* corresponding figures for 2·0, 1·0 and 0·5% ammonium, mercury and control were 82, 75, 68, 59 and 41%; the 2% ammonium had the greatest residual effect and was not phytotoxic. In the treatment of seedlings inoculated with *Cercospora* 2% ammonium had a fungicidal effect equivalent to 2% bordeaux but caused leaf deformation.

1604. Saaltink, G. J.
Bestrijding van ritnaalden, *Agriotes* spp. (**Control of wireworms.**)
Jaarb. Plziekt. Dienst Wageningen 1951/52, pp. 155-7, illus., being *Meded.* **120.**

Experiments with beet and cereals have shown that seed treatment with BHC or lindane will give good control of wireworms. [For earlier work see *H.A.*, 22: 476.]

1605. Bonnemaison, L.
Protection des betteraves et notamment des porte-graines contre la jaunisse. (**Protection of beetroot, and especially seed crops, against yellows.**)
C.R. Acad. Agric. Fr., 1953, **39**: 752-9, bibl. 4.

Recommendations for the control of beetroot yellows include: (1) sow early, thin late, and retain a large number per ha.; (2) concentrate seed crops, which form a major reservoir of the virus, in beetroot growing areas.—Stat. cent. Zool. agric.

1606. Yale, J. W., Jr.
Effects of fungicides and fertilizers incorporated with the soil upon the incidence of beet seedling necrosis.
Abstr. in *Phytopathology*, 1953, **43**: 590.

No significant effect upon the stand of seedlings, yield, or grade of beets was obtained when ceresan M, manzate, ferbam, captan, and C.O.C.S. were incorporated with the soil at 5 lb. per acre, either alone or in combination with fertilizers. Calcium nitrate mixed with the soil before planting significantly increased the stand of seedlings while ammonium sulphate had no such effect. Greenhouse tests confirmed the beneficial effects of the nitrate fertilizer and showed that treble

superphosphate, alone or in combination with calcium nitrate, had no significant effect on incidence of the disease. Potassium chloride and sodium nitrate together increased stands of beet seedlings much more than either chemical alone. Fertilizer treatments were found to be effective only when fresh field soil in normal biological equilibrium was used. Manzate alone at 20 lb. per acre, and ceresan M at 20 lb. per acre with a fertilizer containing sodium nitrate significantly increased stands. The presence of nitrate fertilizer with manzate completely nullified the effects of the fungicide.

1607. Hey, G. H. L.
Seed dressings to control carrot fly and flea beetle.
Comm. Gr, 1953, No. 3026, p. 1263.

Experiments over the last 3 years have shown that lindane, used as a seed dressing at specified rates, can give excellent control of carrot fly on carrot and celery and of flea beetle on crucifers without tainting or adverse effects on germination. Only the early attacks are prevented, so it is necessary to treat a wide area in order to prevent infestation after the effect of the seed treatment has worn off [see also Abstr. 1548].

1608. Atkinson, R. G.
Survival and pathogenicity of *Alternaria raphani* after five years in dried soil cultures.
Canad. J. Bot., 1953, **31**: 542-7, bibl. 11.

Keeping several strains of the seed-borne pathogen of radish, *Alternaria raphani*, for 5 years in dry soil resulted in no loss of virulence to plants of radish, stock and wallflower.

1609. Wallace, J. O.
Turnips and swedes for New Zealand conditions.
N.Z. J. Agric., 1953, **87**, 4 unnumbered pp. between pp. 336 and 337, illus.

Before the second world war New Zealand depended on Great Britain for turnip and swede seeds. During the war the threat of shortage was met by operating a seed production scheme. Today the needs of the New Zealand farmer are filled by 6 swede varieties, 7 yellow-fleshed turnip varieties and 4 white-fleshed turnip varieties, the seed of which is now produced in New Zealand. Notes are given on these.

1610. Ingebrigtsen, S.
Forsøk med ulik planteavstand for kålrot og ulik tynningsavstand for gulrot. **(Experiments on the spacing of swedes and thinning rates for carrots.)** [English summary ¾ p.]
Forskn. Landbruk., 1953, **4**: 385-99, bibl. 7, being *Meld. Stat. Forsøksgård Holt. Tromsø* **20.**

Thinning rates compared for carrots were 3, 5, 7 and 10 cm. in the row. Highest total yields, with the largest proportion of small (under 50 g.) and medium-sized (50–70 g.) roots and the lowest proportion of large (over 70 g.) roots, were obtained from the 3 cm. spacing. The average weight of the roots was found to increase markedly with the wider spacings, but the percentage of cracked roots also appeared to increase. For practical purposes, taking the cost of thinning into account, a distance of 5–7 cm. is recommended.

1611. Danon, M.
Prilog biologiji i suzbijanju kupusne pipe siškarice. **(Contribution to the biology and control of turnip gall weevil.)** [German summary 1 p.]
Zasht. Bilja, 1953, No. 19, pp. 3-16, bibl. 9, illus.

Observations on the biology of the turnip gall weevil, *Ceutorrhynchus pleurostigma*, on cabbage grown for seed near Varaždin and Zagreb, are recorded. Galling did not appear to affect greatly either the weight or the quality of the cabbage heads. Serious damage occurred only when the galls began to rot, after the larvae had left them, which affected plant growth unfavourably and reduced seed production. Of methods of control tried, dusting the roots prior to planting out with BHC preparations (gammexane, bentox, agrocide 3) gave the best results, reducing infestation by 60%.

Salad crops.

(*See also* 1314, 1509, 1647u.)

1612. Moss, N.
Intensive cultivation department [at Luddington].
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 49-59.

Lettuce: spacing experiment in Dutch light ranges: Six different spacings ranging from 7 in. square to 11 in. square were used for 2 varieties of lettuce grown in double-span Dutch lights at both Luddington and Stockbridge House Stations. Mean yields of marketable lettuce on the 2 stations were 12·6 and 9·3 tons per acre respectively. The highest yield in the one case came from the closest spacing (7 in. square) and in the other from the second closest spacing (8 in. triangular). The number of grade 1 lettuce was independent of spacing, but numbers of grade 1 and grade 2 lettuce combined showed various differences. Closer spacings tended to delay cutting dates. Of the 2 varieties May Queen gave better results than Attractie. *Orientation of Dutch light ranges:* The results of another experiment with the same 2 varieties at both stations suggest that double-span lights are superior to single-span both as regards yield and earliness of lettuce, and also that ridge height or glass slope (or perhaps both) can effect these variables. No clear-cut answer was obtained on the question of the orientation of double-span ranges (E.–W., N.–S.) or of single-span ranges (facing E., S. or W.).

1613. Whitaker, T. W., and Bohn, G. W.
The striate-vein character in lettuce.
J. Hered., 1953, **44**: 177-80, bibl. 6, illus.

A peculiar type of leaf venation pattern, termed striate-vein, appeared in an inbred line of head lettuce in 1944. When this line was crossed with a variety having normal netted-vein leaves, the character was shown to depend upon a single recessive gene. [From authors' summary.]

1614. Evenari, M., and Neumann, G.
The germination of lettuce seed. III. The effect of light on germination.*
Bull. Res. Coun. Israel, 1953, **3**: 136-44, bibl. 10.

* For abstracts of Parts I and II see *H.A.*, 23: 4274 and 23: 790 respectively.

At 26° C., the germination of seeds of the lettuce variety Grand Rapids was found to be stimulated by red and inhibited by infra-red radiation. If infra-red was applied *immediately* after irradiation with red, the stimulation of germination induced by the red radiation was completely nullified. However, the greater the time allowed to lapse before the infra-red application, the smaller its counteracting effect. The inhibiting effect of blue and green filters was found to be due to their transmission of infra-red, while the stimulating effect of yellow filters was accounted for by their transmission in the red region. The germination of Grand Rapids seeds at 20° C., and of decoated seeds of the same variety at 26° C., was not inhibited by infra-red radiation. At 26° C. the seeds of the variety Progress were shown to be entirely non-photoblastic, whereas at 29° C. their germination was inhibited by infra-red. In Grand Rapids seeds, photosensitivity set in after 5–8 minutes of soaking. Photosensitivity attained its maximum at 26° C. after 8 hours, 3 hours and 1 hour from the inception of imbibition, for white, red and infra-red light respectively. After 72 hours imbibition, the seeds still reacted to white light, though their photosensitivity was greatly reduced. Photosensitivity was found to be a function of temperature. In the case of red and infra-red light, the product law was found to be a function of temperature. In the case of red and infra-red light, the product law was found valid for the whole range investigated; for white light, its validity was confined to 2,500–9,000 f.c. sec. A theoretical scheme, attempting co-ordination of the observed phenomena, is proposed. [Authors' summary.]—Hebrew Univ., Jerusalem.

1615. Mayer, A. M., and Evenari, M.
The activity of organic acids as germination inhibitors and its relation to pH.
J. exp. Bot., 1953, **4**: 257-63, bibl. 9.

The germination inhibitory activity on lettuce seeds of organic acids related to coumarin was investigated. Little or no relation between structure and activity existed. pH was found to be of secondary importance on the activity of the acids. [From authors' summary.]

Spinach.

(*See also* 1509, 1647a.)

1616. Reinhold, J.
Der Einfluss mineralischer Düngung auf Ertrag und einige Qualitätskomponenten bei Spinat in Gefässversuchen. (**The effect of mineral fertilizers on yield and on certain quality constituents of spinach in pot trials.**)
Arch. Gartenb., 1953, **1**: 203-22.

Spinach was grown in Mitscherlich vessels to which rising applications of N, P_2O_5 and K_2O were added. The yields were in good agreement with Mitscherlich's law. The following results were obtained: (1) The relative *dry matter* content increased with rising K_2O applications but decreased with rising P_2O_5 and N supplies. (2) Rising N supplies increased the protein content but decreased the relative protein content (pure protein: crude protein). P_2O_5 applications had a similar though less pronounced, effect; K_2O applications had the least influence on protein content, which was, however, depressed by severe K deficiency. Absolute protein yields increased in all cases where yields were raised by one of the 3 nutrients. (3) All 3 nutrients, but especially K, increased the *provitamin A* content of spinach leaves. K deficiency caused the strongest depression in carotene content followed by P deficiency, while N deficiency had the least effect. Highest yields of spinach were always associated with highest yields of carotene. (4) K deficiency had a pronounced depressing effect on *ascorbic acid* content, N had little effect, while applications of P_2O_5 reduced it. However, for a high vitamin C content per unit area applications of P_2O_5 in sufficient quantity were found to be essential. Soil analyses showed that: (*a*) Withdrawal of N from the soil increased with rising N applications but also with rising applications of K_2O and P_2O_5. The water-soluble N remaining in the soil after harvest was found to increase with rising N applications but to decrease with rising applications of P_2O_5 and K_2O. (*b*) Corresponding results were obtained for withdrawal and residual content of P_2O_5 and K_2O. (*c*) The soil reaction after harvest was not appreciably affected by the various nutrient treatments. [Shortened translation of author's summary.]—Inst. Gartenbau. Grossbeeren, nr. Berlin.

Tomatoes and capsicums.

(*See also* 1105, 1106, 1116, 1118, 1119, 1145m, v, 1231, 1313, 1506, 1507, 1509, 1510, 1512, 1513, 1647d, g, h, k, l, o, p, q, 1648c, 1746, 1749.)

1617. Wittwer, S. H.
The Michigan-Ohio hybrid: A new F_1 tomato for greenhouse production.
Quart. Bull. Mich. agric. Exp. Stat., 1953, **36**: 191-4, bibl. 2, illus.

Data for early yields over 3 seasons show that the performance of Michigan–Ohio Hybrid (Michigan State Forcing × Ohio WR-3 Globe) was generally equal to the best performance of 4 other varieties. Total yields were significantly greater than those of the 2 parents and the 2 other varieties. Incidence of blotchy ripening was similar to that in other varieties grown in Michigan.

1618. Liger, P.
Le choix des variétés de tomates de conserve dans la région de Bône. (**The choice of processing tomato varieties in the Bône region.**)
Fruits et Prim., 1953, **23**: 348-54, bibl. 17, illus.

Marmande and Marglobe in 1946 accounted for 90% of the tomatoes in the Bône region of Algeria. On the basis of trials begun in 1946 Chatham, Bounty or Marmande, Pearl Harbour, Marglobe and San Marzano are recommended for unirrigated cultivation on various types of soil, and Pritchard, Pearson and San Marzano for irrigated cultivation. In 1953 Chatham and Pearl Harbour both significantly outyielded Marglobe. Only Marglobe, Pritchard and Pearl Harbour are recommended in areas liable to *Fusarium* attack.

1619. Lesley, J. W., and Lesley, M. M.
Fruitfulness, fertility and parthenocarpy in tetraploid species hybrids of *Lycopersicon*.
J. Hered., 1953, **44**: 261-4, bibl. 12, illus., being *Pap. Calif. Citrus Exp. Stat.* **769.**

A tetraploid plant that originated from the cross *Lycopersicon esculentum*×*L. peruvianum* var. *dentatum* was female and male sterile, nearly 100% fruitful, and wholly parthenocarpic. The same degree of fruitfulness did not occur in either parent species, in F_1, in the first backcross generation to *L. esculentum*, or in the 3 generations of inbreeding that followed. [From authors' summary.]

1620. Lewis, D.
The rogue tomato: a problem in nuclear, cytoplasmic and environmental control.
Heredity, 1953, **7**: 337-59, bibl. 12, illus.

In an investigation at the John Innes Horticultural Institution 4 factors were found to increase frequency of rogues: (1) high temperature during germination; (2) low light intensity and short days during germination; (3) the position of the inflorescence on the plant, the 1st and 2nd inflorescences giving a lower percentage of rogues than the 3rd and 4th; and (4) the genetic constitution. Genetic considerations are discussed.

1621. Haskell, G.
Influence of position of truss on pleiocotyly in tomato.
Nature, 1954, **173**: 311, bibl. 2.

The data presented strongly indicate that truss position influences pleiocotyly (=variation in cotyledon number) in tomato. Rogues did not produce a higher proportion of seedlings showing pleiocotyly than normal plants, but pleiocotyls gave rise to twice as many rogues as normal plants. Possible cytoplasmic effects are briefly discussed in relation to pleiocotyly and dicotyly.—John Innes hort. Instn.

1622. Baldin, P. G.
Vegetative hybridization of tomato. [Russian.]
Agrobiologija, 1952, No. 4, pp. 142-5, illus.

A new method of grafting tomatoes is described in which two separate unions are formed. The first is made by approach-grafting two plants together. 12–14 days later the scion is detached from its own roots at a point well below the approach-graft union and the cut end is inarched to the base of the stock plant. This double graft technique is said to improve compatibility and to accentuate rootstock influence. The following year, to intensify further the effect of the stock, seedlings raised from seeds of the second cluster were again grafted on the same rootstock variety.

1623. Persson, A. R., and Bremer, A. H.
Gransking i frilandstomat, A. Gransking i frilandstomat 1947-1952. B. Temperatur og tomatdyrking på friland. (**Experiments on outdoor tomatoes. A. Experiments on outdoor tomatoes 1947-1952. B. Temperature and cultivation of outdoor tomatoes.**) [English summary 2 pp.]
Forskn. Landbruk., 1953, **4**: 293-316 and 317-27*, bibl. 15, being *Meld. Inst. Grøns. norg. LandbrHøgsk.* **2** (n.s.).
Gransking av frilandstomat. (**Experiments on outdoor tomatoes.**)
Gartneryrket, 1954, **44**: 53-4.

A. The results of 6 years' trials with varieties, strains and F_1-hybrids of the standard type of outdoor tomato are reported. In Norway these are commonly trained to one stem and stopped after the third cluster. Experiments with bush tomatoes showed that it is advantageous to stake vigorous varieties and to remove lateral shoots at planting and twice later in the season. Growth substance treatment, which was superior to hand pollination in improving fruit set, caused a significant increase in yield, especially early yield, over the controls [see also *H.A.*, 23: 1953]. Tomatoes picked green at the end of the season were liable to attack by blight. It is suggested that an initial storage at 38° C., the lethal temperature for *Phytophthora infestans*, may be a practical means of controlling the disease. Most rapid ripening was achieved by storage at 28° C. for 6 days, followed by 12 days' storage at 17–18° C. B. The relationship between yields of tomatoes (total and ripe fruits) and average summer temperatures (June–August and June–September) is reflected in tabulated data and graphs based on 23 years' records in southern Norway at 60° northern latitude. The diagrams in both papers have English captions.

The *Gartneryrket* article is a short, popular account of the same work.

1624. Allerton, F. W.
Heavy tomato crop from two-root system.
Grower, 1954, **41**: 83, illus.
Ring culture in the amateur's greenhouse.
Gdnrs' Chron., 1954, **135**: 56, bibl. 1.

The ring-culture method of growing tomatoes, developed at the Tilgate Research Station, Surrey, consists of growing the plants in a bottomless container filled with compost and stood on a bed of ashes, fine gravel or coarse sand [see also *H.A.*, 23: 3757]. It was found that a massive secondary root system would develop in the bed provided it was kept fully charged with water. When this occurred extremely heavy crops, in the order of 20 lb. a plant, were produced. The compost dried out less rapidly than usual and it became apparent that the plants were obtaining nutrients but very little water from the compost and were getting most of their water through the secondary root system in the bed. This system eliminates soil sterilization in the beds, and allows the use of unskilled or automatic watering. Some nutritional problems require further investigation.

The second paper describes the application of the method to a small greenhouse.

1625. Morrison, G.
Background of good vegetable seeds; processing tomato seeds.
Seed World, 1953, **73** (6): 42-3.

The fruits of small lots of tomato can be crushed by means of a hand masher, hoe or hand, and the mass placed in wooden buckets or barrels. Large quantities of fruit are crushed by power-driven devices and the mass placed in shallow burlap-lined pits or large wooden containers. The juice and pulp which surround the seeds are left to ferment for 2–3 days when the day temperatures are 70–80° F., or 3–5 days when the nights are cool and day temperatures do not exceed 40–50° F. The seed is then separated from the pulp by washing with running water.

* Wrongly paged in original as pp. 229-52 and 253-63.

1626. Čirikov, Ju. F., Novickaja, E. I., and Karpenko, E. R.
The size of tomato fruits and their dry matter content. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (7): 23-5, bibl. 5.

At Dnepropetrovsk during 1949-51 the examination of some 50–60 varieties showed that tomatoes weighing 50–100 g. contained a higher percentage of dry matter and were of better quality (higher sugar and vitamin C and lower acid contents) than smaller fruits. In small-fruited varieties the percentage of dry matter content was greatly reduced by unfavourable conditions during ripening.

1627. Jakuškina, N. I., Kravcova, B. E., and Novoselova, G. A.
The effect of temperature on growth and translocation of substances in the tomato. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **91**: 969-72, bibl. 8.

The tomato variety Lučšii iz vseh [Best of all] was grown in winter by artificial illumination at: (1) 23° C. day and night temperatures; (2) 23° C. day and 15° C. night temperatures; and (3) 23° C. day and 8° C. night temperatures. The highest yields were obtained at 15° C. night temperature. When 2,4-D was applied the fruiting capacity of all plants was improved but the greatest yield increases were obtained on those grown under high night temperature. Photosynthesis was reduced only slightly by the lower night temperatures but respiration at 8° C. was much reduced. The carbohydrate, particularly starch, content of leaves, however, was highest in plants grown at high night temperature. The monosaccharose content of leaves and petioles increased as the result of reduced temperatures and was also affected by 2,4-D applications.

1628. Johnson, S. P., and Hall, W. C.
Vegetative and fruiting responses of tomatoes to high temperature and light intensity.
Bot. Gaz., 1953, **114**: 449-60, bibl. 18, illus., being *Tech. Art. Tex. agric. Exp. Stat.* **1597.**

1. A study, involving the effects of high temperatures [95–100° F.] on the fruiting response of two types of tomato, Marglobe and three summer-setting selections (S-1112B, S-1114C, and S-1119N), was conducted in four phases. In phase 4 an additional commercial variety, V617 Pearson, was also used. 2. In phase 1 the effect of increasing temperatures on the fruitfulness of Marglobe was observed when flowers were cluster-sprayed with 10 p.p.m. parachlorophenoxyacetic acid (CPA). With the onset of high temperatures in mid-July the Marglobe plants became unresponsive to CPA or any other type of treatment, and fruiting ceased entirely. 3. Phase 2 was conducted in the greenhouse to determine the interrelation of sucrose-urea and CPA sprays under different light intensities. Marglobe plants under high light intensities came to a standstill vegetatively and reproductively and failed to respond to any treatment. In the shaded section of the greenhouse Marglobe set fruit in response to CPA sprays, even though daily temperatures were often in excess of 110° F. S-1112B plants, with racemose-type inflorescences, produced parthenocarpic fruit under reduced light intensity without the aid of CPA treatment. 4. Phase 3 was conducted outdoors, employing Marglobe and the summer-setting selections. Other than the first fruit spur, the Marglobe plants were not receptive to CPA in inducing fruit-set. The summer-setting selections responded to CPA applications throughout the high-temperature period and produced a much greater number of parthenocarpic fruits compared with unsprayed plants. 5. In phase 4 chemical analyses of the tops of representative field-grown V617 Pearson plants (which failed to set fruit) were compared with those of fruiting S-1119 plants grown under the same conditions of high temperatures and light intensity. The data showed little evidence that the difference in fruiting was due to chemical composition, since the inorganic elements, carbohydrates, or nitrogen were not limiting in either case. 6. The possible causes of fruiting failure under high temperatures are discussed. [Authors' summary.]

1629. Arnold, C. Y.
Phosphorus requirements of transplanted tomatoes on heavy soils.
Soil Sci., 1953, **76**: 405-19, bibl. 12.

Arnold and Schmidt's constant for a modified Mitscherlich equation [see *H.A.*, 21: 2691] makes the equation a specific description of the relationship of the yields of transplanted tomatoes to the amount of available soil P as measured by a particular soil test, but the usefulness of the equation is limited by the fact that it deals only with the soil forms of P and their relation to tomato yields. An account is given of a series of field trials in which the response of transplanted tomatoes to P fertilizer at several P fertility levels was studied. Equations describing this response permit estimation of the percentage yield that can be obtained from combinations of available soil forms, broadcast superphosphate, and P in the transplanting water. These equations can be used in conjunction with certain economic factors to indicate the most profitable rate of P fertilizer application.

1630. Leopold, A. C., Guernsey, F. S., and Langston, R.
Pantothenic acid and acetic acid utilization in tomato fruit-set.
Plant Physiol., 1953, **28**: 748-51, bibl. 10.

Acetic acid alone was essentially ineffective in fruit set in experiments with excised auxin-sprayed tomato flowers, but when pantothenic acid was added a striking quantitative response to acetic acid was obtained, reaching 60% fruit set.

1631. Ruszkowska, M., and Zinkiewicz, J.
Kwas askorbinowy w pomidorach. (**Ascorbic acid in tomatoes.**) [English and Russian summaries ½ p. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (2): 29-43, bibl. 15.

The influence of certain external factors on ascorbic acid formation in tomatoes grown under both controlled and field conditions was studied in 1950 and 1951. It was found that Mn and B fertilization and insolation increased the ascorbic acid content of the fruit. Other factors affecting ascorbic acid formation were soil type, soil moisture and variety. It was noted that conditions favourable for ascorbic acid accumulation in the fruit were those suitable for the general growth and development of the plant.

1632. Berger, S., Wertheim, A., and Krżyzanowska, M.
Zawartość beta-karotenu (provitaminy A) i karotenoidów w pomidorach i dyni oraz witaminy C w dyni. (**Carotene content (provitamin A) and carotinoids in tomatoes and pumpkins and vitamin C content of pumpkin.**) [English and Russian abstracts.]
Przem. roln. spoż., 1952, No. 12, pp. 458-63, from abstr. in *Polish tech. Abstr.*, 1953, **2** (10), No. 2054.

The β carotene content of fresh pumpkin was 1·18 mg. %, that of fresh tomato 0·57 mg. %. Vitamin C content of pumpkin was 13·3 mg. %. Both carotene and vitamin C contents of pumpkin varied with degree of maturity and to a certain extent with variety.

1633. Ciccarone, A.
Anti-traspiranti in agricoltura. (**Anti-transpirants in agriculture.**)
Ital. agric., 1953, **90**: 801-3, bibl. 2, illus.

An account is given of experiments with the anti-transpirant, Plantex-50, a vinyl resin. Diluted with water in the proportion of 1 to 4 it can be applied with an ordinary spray. It dries rapidly and forms a thin skin which remains visible for 7–10 days. Treatment applied to Quarantino tomatoes which had matured their first fruit trusses prevented for about 6 days the slight wilting shown by the controls in hot sunny weather; the treated plants were darker green for a further 10 days. In a test with San Marzano seedlings the plants were treated half an hour before being planted out in heavy clay soil (treatment after transplanting was not so efficacious) and copiously watered after planting; losses were 10% compared with 20% in the controls. In another test with San Marzano, older seedlings were planted out at sunset in still heavier soil and losses were only 2% compared with 10% in the controls.—Ist. Pat. veg. Microbiol. agrar. tec. Univ. Catania.

1634. Spencer, E. L., and Geraldson, C. M.
Symptoms of nutritional disorders of vegetable crop plants. Crease-stem of tomatoes.
A.R. Fla agric. Exp. Stats 1951/52, pp. 241-2.

The exact cause of this disorder remains uncertain but contributing factors appear to be rapid growth and insufficient copper. It is possible that the supply or rate of translocation of copper is temporarily inadequate during periods of very rapid growth. The disorder is associated with internal necrosis of the stem just below the first flower cluster, usually, but not always, accompanied by external creasing.

1635. Greenleaf, W. H.
Effects of tobacco-etch virus on peppers (*Capsicum* sp.).
Phytopathology, 1953, **43**: 564-70, bibl. 13, illus.

A severe strain of tobacco-etch virus (TEV) was proved to be the cause of a wilt disease of Tabasco pepper. The Tabasco pepper was shown to be a sensitive test host for this virus. Several peppers belonging to different species were inoculated in a search for sources of resistance for breeding. The pungent peppers P.I. 152225 from Peru and South Carolina No. 46252 were resistant to TEV but not immune. These 2 peppers should prove useful in breeding resistant varieties. [From author's summary.]—Dep. Hort., Alabama polytec. Inst., Auburn.

1636. Rosa, M.
Prove di lotta chimica contro *Alternaria porri* (Ell.) Saw. f. sp. *solani* (E. et M. pro sp.) Neerg. nella piana del Sarno durante l'anno 1952. (**Experiments in the chemical control of *Alternaria porri solani* on the Sarno plains in 1952.**) [English summary 6 lines.]
Boll. Staz. Pat. veg. Roma, 1952 (issued 1953), **10**: 177-87, bibl. 18.

Five proprietary organic products were tested against 1% bordeaux on San Marzano tomatoes. Of them 0·3% dithane Z-78 (zineb) and the bordeaux proved significantly superior in fungicidal action. The other products in descending order of efficacy were 1% shirlan A.G., 0·22% S.R. 406, 0·15% phygon and 0·4% tulisan (thiram).

1637. Doepel, R. F.
Black spot or early blight of tomatoes.
J. Agric. W. Aust., 1953, **2**: 755-7, bibl. 2, illus.

In tests at Geraldton in 1953 dithane Z-78 (zineb) and phygon XL were equally effective against black spot (*Alternaria solani*) and better than the standard copper oxychloride spray. Total yields were 74, 70 and 46 lb. per plot of 12 plants respectively compared with 37 lb. in the control.

1638. Anon.
Promising spray for tomato leaf mould.
Comm. Gr, 1954, No. 3029, p. 69.

A new compound, manganese dimethyl-dithio-carbamate, has given excellent control of *Cladosporium* on glasshouse tomatoes in a 1-year test at Askham Bryan. It left no detectable deposit, while a proprietary dithio-carbamate which also gave good control left a very heavy deposit.

1639. Dimond, A. E., and Waggoner, P. E.
The cause of epinastic symptoms in *Fusarium* wilt of tomatoes.
Phytopathology, 1953, **43**: 663-9, bibl. 17.

Ethyl alcohol is produced by *Fusarium lycopersici* but not in sufficient quantities to cause epinasty in healthy tomatoes. Ethylene is produced by *Fusarium* in culture and in the diseased tomato plant; tests showed that it is responsible for the epinastic symptoms in *Fusarium* wilt and for the occasional production of root initials, but not for defoliation.—Conn. agric. Exp. Stat., New Haven.

1640. Dimond, A. E., and Waggoner, P. E.
The water economy of *Fusarium* wilted tomato plants.
Phytopathology, 1953, **43**: 619-23, bibl. 9.

Recent studies on Fusarium wilt of tomato (*Fusarium oxysporum* var. *lycopersici*) have presented evidence of a water shortage in the plant as a cause of wilting. In the experiments here described the hypothesis that a water shortage in the leaves of infected plants arises from impediments to water flow was examined from 3 points

of view and nothing inconsistent with this hypothesis was found.—Conn. agric. Exp. Stat., New Haven.

1641. Tolba, M. K., and Saleh, A. M.
Correlation between pH-value of tomato tissue and its susceptibility to attack by two *Fusaria*.
Nature, 1954, **173**: 87, bibl. 2.

The susceptibility of fresh fruit tissue of 3 tomato varieties to *Fusarium culmorum* and *F. oxysporum* was found to decrease with increase in its pH value. This finding should facilitate breeding for disease resistance. —Univ. of Cairo.

1642. (Baldacci, E., and Corradini, V.)
Ricerche sulla malattia del peperone detta "Moria" nel Vogherese con indicazioni di prevenzione e di lotta. **(The "moria" disease of peppers in Voghera and recommendations for its control.)**
[*Publ.*] *Ist. Pat. veg. Univ. Milano* **30,** 1952-53, pp. 32, bibl. 15, illus.

Notes are given on pepper growing in Voghera, on the "moria" disease (a tracheomycosis due to *Fusarium solani*) and on control experiments. Infection takes place through wounds in the root, generally after planting out. Factors favouring the disease are lack of rotation, an accumulation of organic matter in the soil, and soil temperatures in June of 26–28° C. Partial control was obtained by soil fumigation with ethylene dibromide, chloropicrin or formalin and by soil treatment followed by foliage spraying with zinc ethylene bisdithiocarbamate. Recommendations are made for prevention and control in the seed bed and nursery, at planting out and in the field.

1643. Rodriguez Landaeta, A.
Contribución al estudio de la "viruela" del tomate en Venezuela. **(Contribution to the study of tomato leaf spot in Venezuela.)**
Acta cient. Venezol., 1952, **3** (2): 66-7, from abstr. in *Turrialba*, 1953, **3,** No. 257/53.

Tomato leaf spot (*Septoria lycopersici*) occurs in many parts of Venezuela. TP-13, bordalés bayer, zerlate and fermate give effective control. Some varieties of *Lycopersicum peruvianum, L. hirsutum, L. pimpinellifolium* and their hybrids are resistant.

1644. N.S.W. Department of Agriculture, Entomological Branch.
The vegetable weevil.
Agric. Gaz. N.S.W., 1953, **64**: 552-3, illus.

Notes are given on the control of *Listroderes obliquus*, a pest of tomato and root crops, by clean cultivation and by Paris green or BHC bait and DDT dusting or spraying.

1645. Armand, J. E.
Note on control of flea beetles on tomatoes by pre-transplanting treatments (Coleoptera: Chrysomelidae).
83rd A.R. ent. Soc. Ontario 1952, pp. 58-9.

A pre-transplanting spray application of 1 oz. of 50% wettable DDT and ¾ oz. of ziram in 2½ gal. gave good control of flea beetles, among which *Epitrix cucumeris* is the most abundant species attacking tomatoes in Ontario. The treatment had no appreciable effect on plant growth and significantly increased yields.

1646. Desrosier, N. W., and others.
Selling tomatoes on a unit color and defect system (a/b).
Market Grs' J., 1953, **82** (12): 24-5, 29, bibl. 3, illus.

Cannery tomatoes are usually sold on a basis of grades determined by sampling. Errors result from the small size of samples. A new sampling table has been designed at Purdue University, Indiana, which, using the procedure described, gives much greater precision than existing sampling methods.

Noted.

1647.

a Alscher, R. P., and Lavin, G. I.
Chloroplastic structures in the epidermis of spinach leaves.
Bot. Gaz., 1953, **114**: 393-6, bibl. 16, illus.

b Anon.
P.P. finds answer to flea beetle problem.
Comm. Gr, 1953, No. 3022, p. 1068, illus.
Gammasan, containing gamma BHC and thiram.

c Banga, O. (Editor).
6e beschrijvende rassenlijst voor groentegewassen [inclusief vroege aardappel, aardbei, tabak, geneeskrachtige en aromatische kruiden]. **(6th descriptive variety list of vegetable crops [including early potatoes, strawberries, tobacco, medicinal and aromatic herbs].)**
[*Publ.*] *Inst. Vered. Tuinbouwgew. Wageningen*, 1954, pp. 177, illus., fl. 1.75.

d Boll, W. G.
Stimulation of the growth of the radicle after treatment of tomato seed with bromine water.
Nature, 1953, **172**: 963, bibl. 3.

e Chase, J. L. H.
Continuous cloches for early crops.
World Crops, 1953, **5**: 494-6, illus.
Development in Britain and abroad.

f Chopra, R. N.
The endosperm in some Cucurbitaceae.
Curr. Sci., 1953, **22**: 383-4, bibl. 5.
Blastania garcinii, Coccinia indica, Citrullus fistulosus and *Cucumis sativus*.

g Coetzee, W. H. K., Burger, I. J., and Hugo, J. F. du T.
Foreign taste in tomato juice caused by parathion sprays on the plants.
Fmg S. Afr., 1953, **28**: 298, bibl. 1.

h Corey, A. T., and Blake, G. R.
Moisture available to various crops in some New Jersey soils.
Proc. Soil Sci. Soc. Amer., 1953, **17**: 314-17, bibl. 6.
Including tomatoes.

i Dg.
Bohnenfliegenschäden. **(Losses caused by the bean seed fly.)**
Gartenwelt, 1954, **54**: 20.
Delia [*Hylemyia*] *cilicrura* and its control.

j ELLIS, D. E.
Cucurbit diseases in North Carolina and their control.
Bull. N.C. agric. Exp. Stat. **380,** 1953, pp. 11, illus.

k FALK, K.
Sortsforsøk med veksthustomater 1953. (**Variety trials with glasshouse tomatoes 1953.**)
Gartneryrket, 1953, **43**: 863, being *Meld. Inst. Blomsterdyrk. Veksthusfors., norg. LandbrHøgsk.* **55.**

l FALK, K.
Avstandsforsøk med veksthustomater. (**Spacing trials with glasshouse tomatoes.**)
Gartneryrket, 1954, **44**: 71-2, being *Meld. Inst. Blomsterdyrk. Veksthusfors., norg. LandbrHøgsk.* **57.**
No differences noted in yield or earliness.

m HILLMANN, H. D.
Bestimmung von Erbsensorten im Keimlingsstadium. (**The identification of pea varieties in the seedling stage.**)
Saatgut-Wirtsch., 1954, **6**: 13, bibl. 1, illus.
Based on the first two leaves. See also *H.A.*, 23: 1878 and abstract 1564.

n HOFFMAN, I. C.
Greenhouses for vegetable culture.
Market Grs' J., 1954, **83** (1): 16-17, illus.
The latest types.

o HURTADO BELGADO, M. A. J., AND HOMERO BASSI, R.
Tres armonogramas. (**Three illustrated cultivation calendars.**)
Bol. ext. Univ. nac. Cuyo **3,** 1952, pp. 10.
Including one for tomatoes in Argentina.

p ISAAC, I.
Studies in the interactions between species of *Verticillium*.
Ann. appl. Biol., 1953, **40**: 623-9, bibl. 6.
Five *Verticillium* spp. on tomato and snapdragon.

q ISAAC, I.
The spread of diseases caused by species of *Verticillium*.
Ann. appl. Biol., 1953, **40**: 630-8, bibl. 9.
To tomato and snapdragon by root contact.

r KELSHEIMER, E. G., WALTER, J. M., AND BECKENBACH, J. R.
Compatibility of insecticides, fungicides and nutrients for vegetable crops.
Circ. Fla agric. Exp. Stats **S-47,** 1952, pp. 8.

s KORTE, W.
Buschbohnendrusch jetzt kein Problem mehr. (**The threshing of dwarf beans no longer a problem.**)
Saatgut-Wirtsch., 1953, **5**: 275-6.
A threshing machine for delicate seed described.

t KRAUSE, W. G. C.
Grafting cucumbers [and melons]. How the Dutch do it.
Comm. Gr, 1954, No. 3029, pp. 73-4, illus.

u KRISTENSEN, H. R.
Salatmosaiksyge—en frøbåren virussygdom. (**Lettuce mosaic, a seed-transmissible virus disease.**)
Horticultura, 1953, **7**: 111-15, bibl. 24.

v MINISTRY OF AGRICULTURE, LONDON.
Celery fly.
Adv. Leafl. Minist. Agric. Lond. **87,** amended 1953, pp. 3, illus.
Life history and control of *Philophylla heraclei*.

w N.S.W. DEPARTMENT OF AGRICULTURE, ENTOMOLOGICAL BRANCH.
The bean fly.
Agric. Gaz. N.S.W., 1953, **64**: 665-6, illus.
Control of *Agromyza phaseoli* with DDT or nicotine sulphate.

x PARRIS, G. K.
Diseases of watermelons.
Bull. Fla agric. Exp. Stats **491,** 1952, pp. 48, illus.

y PLOPER, J.
Manual de la huerta familiar. (**Kitchen garden manual.**)
Publ. misc. Estac. exp. agric. Tucumán **7,** 1953, pp. 86, illus.
In Tucumán, Argentina.

z RITCHER, P. O., AND JONES, G. D.
Vegetable insect control in North Carolina.
Ext. Circ. N.C. agric. Ext. Serv. **313,** revised 1952, pp. 22, illus.

1648.

a SNEEP, J.
Practijkproeven met spitskool 1949-1950 en 1950-1951. (**Field trials with spring cabbage in 1949-1950 and 1950-1951.**)
Meded. Inst. Vered. Tuinbouwgew. **51,** 1953, pp. 15, fl. 0.65.
Varieties and strains suitable for the Netherlands.

b SPENCER, E. L., BURGIS, D. S., AND JACK, A.
Crop response as influenced by soil fumigation.
Proc. Soil Sci. Soc. Fla 1952, **12**: 72-5, bibl. 15, being *J. Ser. Fla agric. Exp. Stats* **140.**
A review on responses of vegetables to DD, EDB, etc.

c STREET, H. E., AND MCGONAGLE, M. P.
Factors controlling meristematic activity in excised roots. IV. Habituation of the main axis meristem of excised tomato roots to repeated subculture.
Physiol. Plant., 1953, **6**: 707-22, bibl. 8.

d U.S. Department of Agriculture.
The Mexican bean beetle in the east and its control.
Fmrs' Bull. U.S. Dep. Agric. **1624,** revised 1953, pp. 16, illus.
Epilachna varivestis and its control.

e van der Vliet, M.
Ziekten en beschadigingen van kool. (**Diseases and pests of brassicas.**)
Meded. PlZiekt. Dienst **121,** 1953, pp. 35, illus., fl. 0.95.

f Wager, V. A.
Leaf spot or blight of carrots.
Fmg S. Afr., 1953, **28**: 393-4, illus.
Macrosporium carotae and its control by copper fungicides.

g Wellendorf, M.
Farvestoffer hos radise og raeddike. (**Pigments of radish and black radish.**)
Horticultura, 1953, **7**: 107-11, bibl. 7.
Found to be pelargonidin derivatives.

h Wilson, J. W., and Hayslip, N. C.
Insects attacking celery in Florida.
Bull. Fla agric. Exp. Stats **486,** 1951, pp. 37, bibl. 10, illus.

i Wiltshire, G. H.
The oxidation of tryptophan in pea-seedling tissues and extracts.
Biochem. J., 1953, **55**: 408-16, bibl. 29.

TOBACCO.

General.

(*See also* 1068, 1070, 1103, 1647c, 1914, 1917, 2099.)

1649. Crawford, D. E.
Tobacco production practices in the Coastal Plain area of South Carolina.
Bull. S.C. agric. Exp. Stat. **405,** 1953, pp. 29, illus.
Information is given on the soils and climate of this flue-cured tobacco area and on nursery practice, land preparation, fertilization, transplanting, cultivation, topping and desuckering, harvesting and curing, costs and returns.

1650. Mattison, J. R., Martin, J. A., and Senn, T. L.
Aromatic tobacco. Instruction for its production in South Carolina.
Bull. Clemson agric. Coll. **111,** 1953, pp. 36, illus.
This bulletin, a revision with minor amendments of the first edition published in 1949, gives information on Turkish tobacco growing in South Carolina. Subjects include soils (heavy clays the best), nursery practice, field preparation, cultivation, harvesting, curing, storage, baling, diseases and pests. The 3 types of Turkish tobacco which have been grown successfully in the south-eastern United States are Samsun, Smyrna and Cavalla.

1651. Stinson, F. A. (Tobacco Research Board of Southern Rhodesia).
Report of progress 1951/53.
Bull. Tobacco Res. Bd S. Rhod. **3,** 1953, pp. 48, illus.
Since publication of the last biennial progress report [*H.A.*, 22: 4556] the Board has opened a Research Station south of Salisbury and stopped work on cigar and dark-fired tobacco. Flue-cured tobacco is the main study but limited work on Turkish tobacco continues. Work is reported on: *Seedling production.* Steam sterilization and fumigation of soil; brushwood burning on beds against weeds; vermiculite to improve root systems; fertilization; watering; disease and insect control. *Time of planting.** *Ploughing.* Better yields were obtained by deeper ploughing (9 in. compared with 6 in.) and by subsoiling under the rows; early ploughing called for less N; ploughing before October reduced white grub damage. *Varieties.* Delcrest and Hicks gave the most promising results. *Fertilizer experiments.** *Ridging and cultivation.* Ridging is unnecessary and possibly disadvantageous on deep well-drained topsoils, but is beneficial on flat, ill-drained land; early cultivation is important, but cultivation is undesirable after the plants are 15–18 in. high. *Topping.** *Desuckering.* Three different methods gave yields ranging from 1,528 to 1,775 lb. per acre compared with 1,462 from non-removal, and slightly better grade index, namely 55–57 compared with 53. *Priming* is of no practical use for controlling frog-eye. *Curing.* Higher temperature and RH, obtainable by moisture-proofing barn walls, give brighter leaf of better quality and reduced barn spot. *Crop rotation and cropping systems.* Yields from tobacco following various crops were: munga 1,255 lb./acre, cotton 1,218, peanuts 1,134, tobacco 1,078, oats 1,019, maize 969 and fallow 915. *Stalk disposal.* Ploughing under caused no increase in disease and is standard practice at the Research Stations. *Disease and pest control.*

* See separate abstracts.

1652. Collins, J. C.
N.R. tobacco research.
N.R. research. Variety trials.
Rhod. Fmr, 8 January, 1954, pp. 10-17 and 15 January, 1954, pp. 10-11, 13.
Tobacco research in Northern Rhodesia in 1951/52 and 1952/53 was again confined to Mochipapa station (a light-bodied coarse sand) in the Southern Province and Msekera station (heavy sandy loam) in the Eastern Province. These soils are at the opposite extremes of suitability for flue-cured Virginia-type tobacco. As far as possible the same experiments are carried out at both stations. Experiments included (1) seed-beds: watering by capillary action, use of vermiculite instead of soil, cheese cloth *v.* grass covers, soil sterilization by flame-thrower; (2) fertilizer experiments; (3) varietal trials: flue-cured Virginia and Turkish; (4) tobacco rootknot nematode control; and (5) crop rotations. From the point of view of yield per acre, quality and cash return the most promising varieties are Bonanza, C/10, White Stem Orinoco, Yellow Mammoth, C/7, Gold Dollar and Duquesne.

1653. Cyprus (Corbett, G.).
Annual Report for 1952. Annexure V. Annual Report of the Tobacco Officer for 1952, 1953, pp. 9.

Varietal trials. Elsenberg and Soulook gave the highest yields among 6 varieties. Smyrna O gave higher yields than Smyrna G and Sari B than Sari A. *Spacing trial.* Elsenberg apparently gave higher yields at 18-inch than at 12-inch spacing between rows.

Breeding and varieties.

1654. Anon.
L'amélioration de la culture du tabac en Autriche. **(Improvement in tobacco growing in Austria.)**
Rev. Tabacs, 1953, **28** (204): 39-41, illus.

One of the main tasks of post-war tobacco research in Austria was to choose from among varieties cultivated in Europe those most suitable for growing in Austria. The varieties chosen were certain Hungarian types (dark alkaline tobaccos), Havana II C and Gaudertheimer, for cigars; Debreziner and Theiss for pipe and chewing tobaccos; and light Hungarian tobaccos, Scaferlati types, especially Sabolz, and the Italian Burley Giuseppina for cigarettes. Other research projects have been the breeding of improved varieties from these, for example Debreziner WFR, the hybridization of foreign varieties, the breeding of new high-quality, high-yielding giant varieties (e.g. Gladiator, Hercules, Excelsior, Rex), of nicotine-poor varieties (e.g. the cigar variety Carmencita), and of cigarette varieties with low nicotine, low total N and low albumen contents.

1655. Anon.
Aspects de la recherche agronomique en 1952. [Essais sur tabac.] **(Notes on agronomic research 1952. Tobacco trials.)**
Rev. Agric. Brux., 1953, **6**: 1725-32.

New hybrid variety trials: H23.1 (Broyard / Kentucky) and H27.5 (Kentucky / Variety 06) are vigorous forms with large broad leaves; they significantly outyielded the control, Philippin. Three long- and narrow-leaved Kentucky / Variety 06 hybrids outyielded the control, Variety 06. *Introduced variety trial.* Among 14 varieties the Spanish Valencia Alto alone was significantly superior in yield to the control, Philippin, while the Spanish Hibrido 217.F and the French Paraguay L and G were superior in quality and approximately the same in yield. *Nicotiana rustica variety trials for nicotine production.* Trials with 12 varieties showed that (1) those with the highest green matter yield had the lowest nicotine content; and (2) those giving the highest nicotine yield per ha. (Argentine, Swabacher and Strain 3) are those giving a moderate green matter yield and having a moderate nicotine content.—Stat. rech. État Amél. Plantes grande Cult., Gembloux.

1656. Benincasa, M.
Tabacchi americani da sigarette. **(American cigarette tobaccos.)**
Tabacco, 1953, **57**: 408-13.

Notes are given and recommendations are made regarding the culture in Italy of the American cigarette tobaccos Maryland, Burley and Virginia Bright. The development of high-yielding Italian hybrids resistant to root rot should continue. Bright Italia A-16, Maryland Benincasa, Burley Giuseppina and Burley di Gran Reddito are steps in this direction.

1657. Puzzilli, M.
Sull' utilizzazione delle talee di tabacco. **(On the use of tobacco cuttings.)** [English summary ½ p.]
Tabacco, 1953, **57**: 414-24, bibl. 3, illus.

Potted tip cuttings can mature seed without rooting and are useful for breeding purposes. Cuttings 55–60 cm. long should be taken from plants in full bloom, open flowers and fruits being discarded to avoid heterogamy. Planting should occur under shade, either in the open or in the glasshouse, within 24 hours at most and the base should be trimmed beforehand. Moderate daily watering is required.

Seeds and seed beds.

1658. Čirkovskiĭ, V. I.
The influence of ageing of seeds on the development of tobacco plants. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **92**: 439-42, bibl. 4, illus.

Data are presented showing that long storage of tobacco seed reduced not only the percentage of germination but also the yield of leaves per plant; the vitality of the new crop of seed was not, however, affected. Tobacco seed given a 5-day freezing treatment at −20 to −26° C. and then stored for 5 years germinated much worse, and produced less suitable seedlings, than untreated seed stored under similar conditions.

1659. Clark, F., and Volk, G. M.
Plant beds for flue-cured tobacco.
Circ. Fla agric. Exp. Stats **S-44,** 1952, pp. 18, illus.

Siting, preparation and manuring of beds, control of weeds, pests and diseases especially blue mould, sowing and cultural practices.

1660. (Steinberg, R. A.)
Temperature and tobacco.
Agric. Res., 1954, **2** (8): 11.

Investigations have shown that low temperatures in the seedling stage will induce flowering in shy-flowering tobacco hybrids and that the lower the temperature in the seed-bed the earlier will plants flower after being set out in the field. [See also *H.A.,* 23: 3211.]

Rotations and cultivation.

1661. Kincaid, R. R.
Effects of two-year rotations on nematode diseases, yield, and quality of cigar-wrapper tobacco.
Proc. Soil Sci. Soc. Fla 1952, **12**: 78-83, bibl. 15, illus., being *J. Ser. Fla agric. Exp. Stats* **142.**

Six test crops of cigar-wrapping tobacco were grown in 2-year rotations with three summer legume and oat combinations, corn and native vegetation, three native weeds, and three native grasses, with continuous tobacco as the check. The average results showed significant differences in incidence of root-knot and a nematode root rot called coarse root, yield, grade index,

crop index and burn test. Better tobacco crops were obtained with cocklebur [*Xanthium pungens*], Texas millet (buffalo grass) [*Panicum texanum*], and corn-native vegetation rotations than with continuous tobacco. Poor results were obtained with coffeeweed [*Emelista tora*], crotalaria-oats, and goose grass [*Eleusine indica*] rotations. No significant correlation was found between root-knot index or coarse root index and yield suggesting the operation of other factors, probably including fertility. [Author's summary and conclusions.]

1662. Stinson, F. A. (Tobacco Research Board of Southern Rhodesia).
Time of planting.
Bull. Tobacco Res. Bd S. Rhod. **3,** 1953, pp. 12-15.

Yield in relation to planting date. In flue-cured tobacco planting date experiments at Trelawney Research Station in 1952/53, planting was done at fortnightly intervals from 31 October to 12 January. Grade index (52·1), yield (1,302 lb./acre) and crop index (678) were highest for 14 November planting and fell progressively and rapidly as the season advanced. The figures for 28 November, for example, were 29·9, 1,102 and 330. General experience is that the best crops are grown when total rainfall is higher during the second than during the first half of the growing season; in S. Rhodesia this combination is normal when planting is done in October/November. *Seasonal distribution of root knot nematodes.* In October/November nematodes are relatively few and not found in the top layers, in January/March they are abundant in the top soil, in May/August they are again absent from the top soil. *Soil insect damage.* The mortality through insect attack in fortnightly plantings at Trelawney in 1952/53 was 10 November 8%, 24 November 19%, 8 December 25%, 22 December 51% and 5 January 25%.

1663. Erakman, K., and Mühendisi, Y. Z.
Tütün ziraatinda dikim araliklarinin verim, kalite ve morfolojik vasiflar üzerindeki tesiri. (**The effect of spacing on yield, quality and morphology of tobacco.**) [English summary ¼ p.]
Tekel Enst. Raporlari, 1951, **6** (1): 139-42, bibl. 5.

In experiments, carried out for 3 years with 3 planting distances on 3 tobacco varieties, closer spacing reduced the height of the plants and the nicotine content of the leaves, increased yields and improved quality.

1664. Bolsunov, I.
Experiments with shade tobacco.
Tobacco N.Y., 1953, **137** (27): 15-16, illus.

Notes are given on shading experiments at the Tobacco Breeding Station, Furstenfeld, Austria, in which cigar tobacco varieties (Havana II C and Sumatra) were grown in "half-shade" between lines of tall annuals such as maize, giant sunflower, Jerusalem artichoke, *Phaseolus multiflorus*, hemp, *Sorghum* and giant tobacco. Investigations showed that such tall plants can reduce by 50% the light falling on the plants they shelter and reduce wind force by as much as 64%. The shade-grown tobacco gave a finer, thinner, more delicate leaf but lower yields than sun-grown controls. [See also *H.A.*, 24: 562.]

1665. Copley, T. L., and Forrest, L. A.
Mulch baik!
Res. and Fmg, 1952, **10** (3): 11, illus.

An effective soil and water conservation practice for use in tobacco fields is described. The method consists of sowing a winter cover of rye in September and then cultivating up the planting rows in early spring, leaving only a narrow strip of rye, 6–12 inches wide, in the inter-rows. The tobacco is planted and cultivated normally and the rye allowed to grow to maturity. At the last cultivation the rye is ploughed out and the mature straw scattered over the row middles as a mulch. Yields and value of the tobacco crop have been as good as in any other 1-year rotation, the tall rye furnishes some protection against wind and rain, and the mulch considerably reduces soil erosion and water run-off.

Nutrition and irrigation.

(*See also* 1129.)

1666. Stinson, F. A. (Tobacco Research Board of Southern Rhodesia).
Fertilizer experiments.
Bull. Tobacco Res. Bd S. Rhod. **3,** 1953, pp. 20-30.

Placement. Among 4 methods average yields were highest with a circular band 8 in. diameter round each plant (1,355 lb. per acre) and with 2 continuous bands along the ridge, each 4 in. from the plants and 4 in. below the surface of the ridge (1,319 lb.). *Nitrogen rate.* Yield rose as N rate was increased from 15 to 45 lb./acre but grade index declined with increasing N, especially with early ploughing. Barn-spotting increased with increasing N. Increasing N thus does not overcome the disadvantage of late ploughing. *Nitrogen fractional application* gave no improvement in November planting; in December planting applying part of the N 3 weeks after planting gave slight improvement in grade and yield. *Nitrogen source.* Sulphate of ammonia and nitrate of soda alone and in various combinations were compared at Trelawney in 1951/52 and 1952/53. Equal proportions gave the highest yield in 1951/52 and the highest grade and yield in 1952/53. *Phosphate rates.* Increased applications generally resulted in increased yields when properly placed and when adequate supplies of other nutrients were available. In an experiment using 3 levels each of P_2O_5 and K_2O the response of flue-cured tobacco to either P or K depended on the amount of the other available; with 90 lb. K_2O the leaf yield increased with each increase of P_2O_5. *Potash rate.* Response to K is limited by supply of P. Experiments are described. *Potash source.* Application of chlorine should not exceed 20 lb. per acre. *Potash fractional application.* No significant effect. *Boron.* 1–5 lb./acre was beneficial. 30 lb. caused toxic symptoms. *Magnesium.* Deficiency symptoms appeared in land under cultivation for 5 years at Trelawney but Mg treatment had no effect on virgin land. *Flue-cured fertilizer recommendations.* (1) Placement in 2 bands 8 in. apart at, or slightly below, root crown level; (2) 100 lb. phosphate, 90 lb. potash but not more than 20 lb. Cl, and 2–3 lb. borax per acre; (3) 8–36 lb. nitrogen, partly as a top dressing 3 weeks after planting if planting in December, one quarter in nitrate form; and (4) 20 lb. magnesia per acre if needed.

1667. Hall, N. S.
A-bomb works for farmers.
Res. and Fmg, 1952, **10** (3): 12-13, illus.
Root studies with radioactive phosphorus on a number of crops, including tobacco, are reported. With tobacco it was found that for the first week or two after planting nutrients were obtained mainly from the soil directly under the plant at a depth of 3–5 inches. Later, 4–6 weeks after planting, nutrients were obtained mainly from the soil at a depth of 6–12 inches and as far as 8–12 inches around the plant.

1668. Neas, I.
Sulphur nutrition in flue-cured tobacco.
Agron. J., 1953, **45**: 472-7, bibl. 18.
Sulphur deficiency symptoms were observed in greenhouse- and field-grown tobacco in Georgia where sulphates were omitted from the fertilizers. Various combinations of 90 and 200 lb. K_2O and nil–200 lb. SO_3 per acre, in addition to constant amounts of other fertilizers, were used in an investigation of sulphur nutrition in Virginia Bright leaf tobacco. The omission of sulphate resulted in sulphur deficiency symptoms during dry periods in the early stages of growth, but these symptoms disappeared following rain. There was a close relationship between the sulphate contents of the fertilizer and of the cured leaf. As the SO_3 content of the fertilizer was increased the duration of burn decreased. Highest rates of sulphate masked some of the beneficial effects of potash, particularly in relation to burn. The data indicated that the amount of sulphate should be kept as low as possible.

1669. van Bavel, C. H. M.
Chemical composition of tobacco leaves as affected by soil moisture conditions.
Agron. J., 1953, **45**: 611-14, bibl. 16.
Flue-cured tobacco was grown under conditions where the maximally occurring soil moisture tension could be controlled with overhead irrigation. Three moisture regimes were established. The experiment also included two lime levels and two levels of fertilizer addition. Soil moisture tension was found to greatly affect the chemical composition of the leaves. Low tension (high moisture content) gave lower content in the cured leaves of nicotine, total nitrogen, CaO and MgO, but higher content of sugars, as well as better burning characteristics, high yield and higher market value. Potassium content was ambiguously affected, being high for dry and wet conditions but low for an intermediate condition. Interaction with the lime and fertilizer level was slight. Differences in nicotine content and market value were more pronounced at the high lime level and differences in potassium content were more outstanding at the high rate of fertilization. Results are found to be in good agreement with earlier work. The possible physiological mechanisms are discussed. [Author's summary.]

Flowering, topping and desuckering.

1670. Deĭmontovič, B. I.
Artificial self-pollination of tobacco. [Russian.]
Agrobiologija, 1951, No. 5, pp. 141-2.
Examples are quoted suggesting that open pollination produces tobacco of better leaf characters and fewer abnormalities than artificial self-pollination.

1671. Stinson, F. A. (Tobacco Research Board of Southern Rhodesia).
Topping.
Bull. Tobacco Res. Bd S. Rhod. **3**, 1953, pp. 31-4.
Topping v. no topping. In an experiment at Trelawney extra N was given 8 weeks after transplanting to test the theory that topping is ill-advised if excessive or late N has been given. Topping significantly improved grade in both November and December plantings (44·6 and 34·4 for the 2 dates compared with 36·7 and 30·4 in the untopped control) and yield in the December planting (1,233 and 989 lb./acre compared with 1,379 and 849). There was no indication that leaving the tops on would be useful in overcoming the effects of excessive nitrogen. *Early and late topping.* Research Station procedure is to top all plants when 10% show first flowers in such a way that the topmost leaves left are approximately the same size. Early topping reduces short leaf percentage and raises grade. At Kutsaga in 1951/52 grade index and percentage high quality leaves were 49·3 and 14 at 10% first flowers but only 46·9 and 6 at 90% first flowers. *Topping height.* At Kutsaga in 1951/52 lower topping increased grade value, and reduced short leaf percentage and leaf number per lb.; yield was reduced but less labour was needed for reaping, grading and tying the heavier leaf produced. For 12-leaf topped plants the grade index, yield, short leaf percentage and cured leaf number per lb. were 53, 679, 30 and 109 respectively, for 15-leaf plants the figures were 49, 745, 37 and 125, and for 18-leaf plants 48, 807, 45 and 138.

1672. Calvert, J.
The control of sucker growth in tobacco by growth substances and mineral oils.
Aust. J. agric. Res., 1953, **4**: 390-402, bibl. 15, illus.
Indoleacetic acid ranging in concentration from 50 to 10,000 p.p.m. significantly reduced the growth of suckers on plants which had had the apical leaves and inflorescence excised. Five mineral oils significantly reduced suckering in tobacco grown in the glasshouse. Twelve mineral oils tested in north Queensland under conditions similar to commercial growing were all highly effective in reducing sucker growth. As the concentration of indoleacetic acid increased, the epinastic effect on the leaves became more pronounced. The mineral oils did not produce epinasty. No pathological reactions were observed with any of the treatments. Maleic hydrazide was the only growth regulator used in the field that significantly reduced sucker growth. [Author's summary.]

1673. Wilson, R. W., Woltz, W. G., and Scofield, H. T.
Mineral oil for sucker control.
Res. and Fmg, 1952, **11** (1): 3-4, illus.
A new topping-suckering tool suitable for Virginia but not Burley tobacco tops the plant and at the same time ejects a small quantity of mineral oil emulsion which flows down the stem to destroy the suckers. It cuts the time required for the 2 operations to less than a quarter.

1674. Bolsunov, I.
Ergebnisse der Köpf- und Entgeizversuche mit einigen in Österreich gebauten Tabaksorten. **(Results of topping and pruning trials with Austrian tobacco varieties.)**
Fachl. Mitt. Österreich. Tabakregie, 1953, Heft 3, pp. 17-23.

The effect of topping and desuckering was studied in several tobacco varieties and in a variety of *Nicotiana rustica*. Tabulated data record the response of the treatments in respect of yield, nicotine content, sugar content and quality. In the variety Sabolz, with which the more recent experiments (1952) were carried out, the combined treatment increased yield and improved quality. When topping was delayed until after flowering nicotine formation in the leaves was reduced.

1675. Wijeratne, W. M.
Inhibition of sucker growth in tobacco.
Trop. Agriculturist, 1953, **109**: 139-40, bibl. 3.

The application, immediately after topping, of coconut oil to rudimentary suckers in the upper 5 or 6 leaf axils inhibited sucker growth.

Hail damage.

1676. McCants, C. B., and Woltz, W. G.
Profits from a total loss.
Res. and Fmg, 1952, **10** (3): 8-9, illus.

Tests and commercial experience in N. Carolina have shown that when hail damage has apparently caused a total loss of the tobacco crop within 6 weeks of planting, 65–75% of the crop can be saved by carrying out the following programme: (1) clearing away broken plant parts promptly, (2) leaving about 6 inches of the stalk, and (3) controlling weeds. Several suckers will develop from the cut stems, of which only 1 should be allowed to develop. Suckers from plants broken 4 weeks after transplanting will produce a bigger crop than a new crop of tobacco planted at the same time. The addition of extra nitrogen after the crop had been damaged made no real difference to the yield.

Diseases and pests.

(*See also* 1512.)

1677. Petersen, E. L., and Naylor, A. W.
Some metabolic changes in tobacco stem tips accompanying maleic hydrazide treatment and the appearance of frenching symptoms.
Physiol. Plant., 1953, **6**: 816-28, bibl. 24.

When tobacco plants which have been treated with maleic hydrazide partially overcome the induced inhibition, new growth is abnormal. Leaves develop symptoms characteristic of those present on frenched tobacco plants. Analyses of these very young leaves have shown some similar and some dissimilar biochemical upsets in the new growth under the two conditions. It is suggested that maleic hydrazide and the frenching factor may exert their effect on mitosis by altering the amounts of one or more of the biochemical components determined. [From authors' summary.]—Conn. agric. Exp. Stat. and Duke Univ.

1678. Bates, G. R.
Tobacco diseases.
Rhod. Fmr, 18 November, 1953, pp. 24, 37.

Short notes are supplied on the symptoms and control of the following tobacco diseases occurring in Rhodesia: bacterial—angular spot (*Pseudomonas angulata*) and wildfire (*P. tabacum*); fungus—frog-eye (*Cercospora nicotianae*), brown spot or alternaria spot (*Alternaria longipes*) and mildew (*Erysiphe cichoracearum*); and virus—mosaic, leaf curl and rosette.

1679. Bode, O., and Koltermann, A.
Beobachtungen und Untersuchungen über Viruskrankheiten des Tabaks im Eichsfeld. **(A survey of virus diseases of tobacco in the Eichsfeld region.)**
NachrBl. dtsch. PflSchDienst., Braunschweig, 1953, **5**: 161-4, bibl. 10, illus.

This is the first systematic survey of tobacco virus diseases in the Eichsfeld, an important tobacco growing region in Germany, where the main variety, "Virgin Gold A", is seriously affected by several potato viruses, while tobacco and cucumber mosaic are of minor importance.

1680. Tinsley, T. W.
The effects of varying the water supply of plants on their susceptibility to infection with viruses.
Ann. appl. Biol., 1953, **40**: 750-60, bibl. 8, illus.

Increasing the amount of water supplied to tobacco, *Nicotiana glutinosa* and potato plants before they were inoculated with viruses, greatly increased their susceptibility to infection; plants that received unlimited water produced 10 or more times as many local lesions as plants that received only enough to prevent wilting. Full response occurred in two weeks in winter and four weeks in summer. Differences in susceptibility were decreased but not abolished by growing plants under shade or by incorporating diatomaceous earth in the inoculum. Increasing water produced plants with larger and more succulent leaves and increased susceptibility may be partly due to these structural differences which allow the leaf to be damaged more easily. [From author's summary.]

1681. Newton, W.
Transmission of tobacco mosaic by citrus mealybug.
FAO Plant Prot. Bull., 1953, **2**: 40, bibl. 1.

Evidence is presented from which it is concluded that the mealybug *Planococcus citri* can transmit the tobacco mosaic virus from tobacco to tobacco. It failed to transmit Storey's leaf curl virus.

1682. Berbeć, J.
Zdrowotność tytoniu (*Nicotiana tabacum* L. i *N. rustica* L.) w latach 1949-1951 w Puławach. **(The health of tobacco plants (*Nicotiana tabacum* and *N. rustica*) in Pulawy during 1949-1951.)** [English and Russian summaries 1¼ pp. each.]
Roczn. Nauk rol., Ser. A, 1953, **66** (2): 53-98, bibl. 10.

Three years' observations on tobacco grown on 2 different soil types showed that repeated succession of the crop increased the virulence of diseases, especially such highly infectious types as black root rot, *Thielaviopsis basicola*. Prevailing temperature and moisture conditions, while generally affecting diseases, were not

of equal importance for different types of infection. It was found that the occurrence and intensity of diseases also depended on the physiological characteristics of the variety (frost resistance, length of growing period, root formation); varieties with a long growing period were more susceptible than those with a short growing period. With the exception of cigar type tobaccos, American varieties were more susceptible to diseases, especially black root rot, than oriental varieties. Fertilizers also affected the resistance of plants; K and Ca applications appeared to encourage the development of black root rot. Hybrids were more resistant to diseases, especially black root rot, than their parent varieties.

1683. Alvarez-García, L. A., and López-Matos, L.
Results of tests with new fungicides for the control of damping-off of tobacco in Puerto Rico.
J. Agric. Univ. Puerto Rico, 1953, **37**: 283-7.

Copper oxychloride and bordeaux mixture were superior to the 3 carbamates, fermate, dithane Z-78 and parzate, but all gave effective control.

1684. Miles, P. W.
How to control insects attacking tobacco.
Interim Rep. S. Rhod. Tobacco Res. Bd **3**, 1953, pp. 12, illus.

The major pests of the tobacco plant are described. Notes are given on cultural measures to reduce insect attack and on chemical control.

1685. Nizi, G.
Disinfestazione al trapianto delle piantine di tabacco ed influenza degli insetticidi sulle stesse. (**The disinfestation of tobacco seedlings on transplanting and the effect of insecticides upon them.**) [English summary ⅓ p.]
Tabacco, 1953, **57**: 363-92, bibl. 17, illus.

Insect attack is the chief cause of failures on transplanting. The effect of treating seedlings with chlorinated hydrocarbon insecticides on transplanting was studied at Perugia in 1950-52. The test varieties were Bright, Burley and Kentucky. DDT, BHC and lindane were used at the strengths recommended by the makers as sprays, as dips, as dusts mixed with the soil and as dusts applied in a ring round the plant. They were efficacious against insects but their use is not recommended, because they caused abnormal early growth, a high percentage of failure in some cases, and a reduced rate of growth in some plants, their slow action permitted insects to inflict injury before death, and they were too dear.

1686. Allen, N., and others.
Tobacco hornworm control with organic insecticides.
J. econ. Ent., 1953, **46**: 604-8, bibl. 7, illus.

At the South Carolina Agricultural Experiment Station TDE dusts and sprays were found effective against tobacco hornworms, *Protoparce sexta*, without damaging the tobacco foliage or affecting the flavour or aroma of the product. Applications of endrin were also found very satisfactory, but the after effects of this insecticide have yet to be determined.

1687. Blunck, H.
Thrips tabaci als Tabakschädling in der Turkei. (*Thrips tabaci* **as a pest of tobacco in Turkey.**)
Tekel Enst. Raporlari, 1951, **6** (1): 50-67, bibl. 22.

Crop rotation and various measures promoting rapid development of the tobacco plants are among the recommendations made for thrips control. Insecticides are also considered, but their effect on leaf quality, if applied after the seedling stage, remains to be determined.

1688. Begg, J. A.
Planting-water treatments for the control of wireworms in tobacco.
83rd A.R. Ent. Soc. Ontario, 1952, pp. 54-7, bibl. 4, being *Contr. Div. Ent., Sci. Serv., Dep. Agric., Ottawa* **3087.**

In south-western Ontario the eastern field wireworm *Limonius agonus* is the most important species attacking tobacco. Results of 3 years' trials have shown that lindane in the planting water will satisfactorily protect transplants from wireworms. The material applied at 1 oz. of 25% w.p. per 40 gal. did not damage the plants; in some cases it appeared to stimulate growth.

1689. Kincaid, R. R., and Volk, G. M.
Effects of soil fumigation on cigar-wrapper tobacco and on soil nitrogen.
Bull. Fla agric. Exp. Stats **490,** 1952, pp. 24, bibl. 24.
Soil fumigation for Florida shade tobacco fields.
Circ. Fla agric. Exp. Stats **S-45,** 1952, pp. 6, illus.

Nematodes are the major pests of shade-grown cigar-wrapper tobacco in Florida. Fumigation tests, mainly with dichloropropene-dichloropropane and ethylene dibromide, were carried out in 1946-49. D-D and EDB controlled root knot equally well, giving an average reduction in index of about 65%. EDB controlled coarse root (a nematode root rot apparently closely related to brown root rot) significantly better than D-D but neither was satisfactory. D-D gave an average yield increase of 145 lb. per acre and EDB 167. EDB gave a slight but significant reduction in fire-holding capacity compared with the controls and D-D a further similar reduction compared with EDB. Optimum rates of application were 20 gal. D-D and 15 gal. EDB per acre. With successively later dates of fumigation there were trends towards lower fire-holding capacity, especially with D-D, lower yield and higher grade index. The tests showed that fumigation should be limited to 2 or possibly 3 successive years. Fumigation resulted in the accumulation of ammonia in the soil, and in a generally higher content of nitrate N during the latter part of the growing season.
The circular covers the same ground in less detail.

Composition.

1690. Pearse, H. L.
Examination of tobaccos by paper chromography.
S. Afr. J. Sci., 1953, **50**: 93, illus.

This short article is the summary of a paper read at

Bulawayo in July 1953, in which "techniques for the preparation of tobacco leaf extracts for paper chromatography were described and examples were given of the examination of flue-cured tobaccos grown in South Africa for free amino-acids, soluble sugars and polyphenols. It was shown that changes in free amino-acid composition of the leaf during curing could readily be followed and that in the green leaf the most abundant amino-acids were usually aspartic acid, serine, glutamic acid and gamma-aminobutyric acid, whereas in the cured leaf proline was invariably the most plentiful and asparagine and phenylalanine had all increased in quantity. Poor quality and colour in flue-cured tobaccos arising from excessive nitrogen nutrition was shown to be associated with low sugar content and the reduction in quantity or complete loss of certain of the polyphenolic compounds."—Central Tobacco Res. Stat., Rustenburg. [See also *H.A.*, 23: 3213.]

1691. Frankenburg, W. G., and others.
Analytical studies on harvested tobacco leaves.
Analyt. Chem., 1953, **25**: 1784-98, bibl. 79.
Because existing procedures for the analytical determination of the nitrogen-containing compounds in tobacco do not cover all its nitrogenous constituents, and because of the possible biochemical and industrial significance of these undetermined compounds, a scheme of analysis was devised to permit not only determination of the known constituents, but also classification of the unknown nitrogen compounds in tobacco leaves. This comprehensive scheme involves the stepwise removal of definite nitrogenous fractions from a water extract of a tobacco sample and the determination of the nitrogenous compounds in these fractions. The method is of value for the exploration of the nitrogen compounds contained in different types of tobacco at various stages of their industrial processing and gives a complete accounting of the changes in nitrogenous compounds that occur during these stages. The method may lend itself equally well for nitrogen determination in other plant material. [Authors' abstract.]

1692. Aksu, S.
Chemical composition of Turkish tobaccos and smoking hygiene.
Tekel. Enst. Raporlari, 1951, **6** (1): 180-2.
Analyses of Turkish and bright-yellow Virginia tobacco samples showed that the former have a very much lower nicotine and resin content and are therefore less noxious.

Harvesting, curing and by-products.

(*See also* 1778.)

1693. Bolli, M.
Sulla maturazione delle foglie di tabacco V. Bright. **(On the maturation of Virginia Bright leaf.)** [English summary 16 lines.]
Tabacco, 1953, **57**: 399-407, bibl. 12, illus.
The concept of maturity is discussed and it is concluded that a tobacco leaf is mature when the greater part of the moisture it contains is free and no longer combined with the colloids which are near their isoelectric point. When an immature leaf is cured it yields a brown product of low quality. Experiments showed that if newly harvested immature leaves are caused to absorb 1–2% ascorbic acid through the petiole for 24 hours they become mature during this period and can be cured without danger of alteration in flavour or colour. This is due to the ascorbic acid altering the hydrophilic state of the plasmatic colloids which, approaching their isoelectric point, permit the leaves to lose water rapidly in the early stages of curing, thus avoiding browning due to excess water in later stages.

1694. Weybrew, J. A.
SO_2 poison on tobacco.
Res. and Fmg, 1952, **11** (1): 7, illus.
When tobacco is cured by heat from anthracite the cured leaves are often marked with smooth bleached circles around a hole in the leaf and occasionally with larger irregular areas along the midribs and veins due to sulphur dioxide poisoning. Notes are given on conditions affecting the injury.

1695. Ritchie, R. M., Jr., and others.
Flue cured tobacco barn construction.
Ext. Circ. N.C. agric. Ext. Serv. **316**, revised 1953, pp. 15, illus.
Details are given of the construction of a tobacco barn with a floor space of about 17 sq. ft. Emphasis is laid on the need for a ridge ventilator. Full constructional plans and a bill of quantities are provided.

1696. Patel, M. S., and Srivastava, A. N.
Wealth from tobacco wastes.
Indian Fmg, 1953, **3** (8): 14-15, 32.
Notes are given on the uses of tobacco seed as a cattle feed, seed oil for culinary and other purposes, oil cake and tobacco dust as fertilizers, and tobacco waste as a source of nicotine sulphate and on the possibility of using tobacco stalks as a source of potassium sulphate.

Noted.

1697.

a Adamson, N. J.
Commercial tobacco culture.
Bull. N.Z. Dep. Agric. **137**, revised 1947, pp. 12, bibl. 3, illus. [received 1954].

b Bolsunov, T.
Virginia Bright tobacco breeding in Austria and prospects thereof.
Tobacco, N.Y., 1953, **136** (18): 152-3, illus.

c Braun, A. C.
Bacterial and host factors concerned in determining tumor morphology in crown gall.
Bot. Gaz., 1953, **114**: 363-71, bibl. 13, illus.
Test plants Turkish tobacco and sunflower.

d de Bruin-Brink, G., Maas Geesteranus, H. P., and Noordam, D.
Lycopersicum-virus 3 (Tomato spotted wilt virus), oorzaak van een ziekte bij *Nicotiana tabacum* en *Impatiens holstii*. **(Lycopersicum-virus 3 (Tomato spotted wilt virus), on *Nicotiana tabacum* and *Impatiens holstii*.)** [English summary ½ p.]
Tijdschr. PlZiekt., 1953, **59**: 240-4, bibl. 9, illus.
Detailed descriptions of symptoms.

e COMMONER, B., AND OTHERS.
The proteins synthesized in tissue infected with tobacco mosaic virus.
Science, 1953, **118**: 529-34, bibl. 7, illus.

f CROUSE, R. H.
Aromatic [Turkish] tobacco production.
Ext. Circ. N.C. agric. Ext. Serv. **375**, 1953, pp. 12, illus.

g ELGIN, N.
Nicotiana tabacum L. (Izmir Sortu No. 64) un anatomik vasiflari I. (**An anatomical study of *Nicotiana tabacum* leaf and stem.**) [French summary 1¼ pp.]
Tekel Enst. Raporlari, 1951, **6** (1): 89-106, bibl. 9, illus.

h FOX, C. J. S., AND STIRRETT, G. M.
Annotated catalogue of insect and other invertebrate pests of tobacco in Canada.
83rd A.R. Ent. Soc. Ontario, 1952, pp. 48-54, bibl. 23, being *Contr. Div. Ent., Sci. Serv., Dep. Agric., Ottawa* **3073.**

i GARRISS, H. R.
Nematode control in flue-cured tobacco.
Ext. Circ. N.C. agric. Ext. Serv. **374**, 1953, pp. 15, illus.

j KLECZKOWSKI, A.
Stability of chymotrypsin and tobacco mosaic virus decreased by ultraviolet radiation.
Biochem. J., 1954, **56**: 345-9, bibl. 20.

k LOWNSBERY, B. F., AND LOWNSBERY, J. W.
***Heterodera tabacum* new species, a parasite of solanaceous plants in Connecticut.**
Proc. helminth. Soc. Wash., 1954, **21**: 42-7, bibl. 15, illus.
A parasite of tobacco, etc., described.

l RAZVJAZKINA, G. M.
The importance of tobacco thrips in the development of epidemics of mahorka tip chlorosis. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (6): 27-31, bibl. 5.
[*Thrips tabaci*] as vector of virus disease.

m STEINBERG, R. A.
Growth of tobacco seedlings with nitrate and its reduction products.
Plant Physiol., 1953, **28**: 752-4, bibl. 5.

n THOMSON, R.
Flue-cured tobacco growing in New Zealand.
D.S.I.R. [*N.Z.*] *Inf. Ser.* **1**, 1948, pp. 51, illus. [received 1954].

o WILHELM, S.
***Pythium ultimum*, an injurious component of the rhizosphere in certain soils.**
From abstr. in *Phytopathology*, 1953, **43**: 590.
Its deleterious effect on tobacco growth.

MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS.

Culinary and spice plants.

(*See also* 1076, 1647c, 1742g, h, q, 1914, 1916.)

1698. JOUBERT, F. J., AND COOPER, D. R.
Naras seed protein.
Nature, 1953, **172**: 1190, bibl. 6.
The seeds from the small cucurbit *Acanthosicyos horrida* are exported from South-West Africa to South Africa, where they are used in the confectionery industry. The proteins of the oil-free seed meal are characterized.—Nat. chem. Res. Lab., S. Afr. C.S.I.R., Pretoria.

1699. WAGENINGEN, PLANTENZIEKTENKUNDIGE DIENST.
De bestrijding van de karwijmot, *Depressaria nervosa* Hw. (**Control of caraway moth.**)
illus. [received 1954].
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, p. 36, being *Meded.* **120.**
In comparative trials with various insecticides in 1951 and 1952, 15% parathion dust gave outstandingly the best control of caraway moth, *Depressaria nervosa*. DDT and toxaphene also gave good control, but rotenone dust was unsatisfactory.

1700. PILLAI, V. G.
Using long rhizomes for cardamom planting.
Indian Fmg, 1953, **3** (9): 12-13, illus.
In an experiment at the Cardamom Research Station, Singampatti, the use as planting material of long (8 in.) rhizomes resulted in more shoots per clump, earlier bearing and a larger net return than when short (1 in.) rhizomes were used.

1701. ORCHARD, E. R., AND VAN ROOYEN, C.
Chicory production in South Africa.
Sci. Bull. Dep. Agric. S. Afr. **339** (*Chem. Ser.* **190**), 1953, pp. 76, bibl. 16, illus.
This bulletin covers the culture and processing of *Cichorium intybus* grown in South Africa for blending with coffee. Local demand is 13 million lb. a year and up to 1950-51, when there was an abnormally good crop, production fell short of demand, being approximately 8·4, 2·1 and 3·7 million lb. in 1947/48, 1948/49, and 1949/50 respectively. Notes are given on fertilizer, spacing and variety trials at Alexandria, the main growing area, in 1944, 1945 and 1946. Rotations, including a number of years' grassing down, are recommended. Yields are improved by 400 lb. superphosphate or 5–10 tons Karoo manure per morgen [1 m.=2⅛ acres]. Spacing trials on fairly fertile soil showed that at 15 in. between rows a spacing of 3 in. in the row gave higher yields than 6, 9 and 12 in. The crops should be lifted as soon after maturity as possible as delay leads to loss of quality.

1702. MARINET, J.
La culture du poivre dans l'Inde. (**Pepper growing in India.**)
Agron. trop., 1953, **8**: 482-505, illus.
In the last 15 years pepper production has trebled in India, where it is mainly confined to the western slopes

of the Western Ghats in Bombay, Coorg, Madras and Travancore-Cochin, but has fallen by two-thirds in Indo-China. This is the report of a commission from Indo-China that visited India in 1953 to study pepper growing. The area under cultivation in India is about 100,000 acres and there are 3 types of culture: (1) pure, on live *Erythrina* trees as supports, at 300 vines per acre; (2) kitchen garden culture; (3) on shade trees in tea, coffee and mandarin plantations. Notes are given on supports, preparation and planting of pepper cuttings, attachment to supports, soil maintenance and manuring, flowering, fruiting, harvesting, yield (1 lb. dry pepper per vine per annum), diseases, pests, and approach grafting experiments. Recommendations are made for the rehabilitation of the pepper industry in southern Indo-China.

1703. Lanfranchi, J.
Poivriers. **(Peppers.)**
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 171-86, illus.

Subjects of study were cultural practices (grafting, espalier training, notching above a bud), mineral and organic fertilization, shading and supports (*Erythrina*, *Macaranga* and mulberry), flowering and floral biology, and varietal performances.—Centre d'Experimentation agronomique de Blao.

1704. Blacklock, J. S.
A short study of pepper culture with special reference to Sarawak.
Trop. Agriculture Trin.,* 1954, **31**: 40-56, bibl. 15, illus.

Information is provided on the following aspects of pepper (*Piper nigrum*) culture in Sarawak: history, botany and varieties, soils, manures, propagation, planting, cultural operations, pests, diseases, harvesting, yields and preparation for market.

1705. Konstantinov, N. N.
Some peculiarities of the biology of black pepper (*Piper nigrum*). [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **91**: 667-70, illus.

The characteristics and requirements of black pepper in its natural environment are described and compared with those exhibited when it is grown under less favourable conditions. It was observed that plants grown in Moscow in the open from June to October produced more laterals but had a shorter main stem than similar plants grown under glass. When grown in trenches the aerial parts over-wintered successfully at −0·5 to 2° C., but the roots were damaged by excessive soil moisture, and this led to the death of the plants. Trials on trench cultivation, showing particular promise for the Batum region, are to be continued.

Drug plants.

(*See also* 1077, 1647c, 1742d, e, k, p.)

1706. Burg, J. P. L. L. A.
Kruidenteelt in Joegoslavië. **(Herb growing in Yugoslavia.)** [English summary 7 lines.]
Meded. Dir. Tuinb., 1953, **16**: 867-77, illus.

Herbs are exported from Yugoslavia on an important scale. Cultivation, however, is limited to a few species, namely *Coriandrum*, *Mentha piperita*, *Foeniculum*, *Digitalis purpurea*, *D. lanata*, and *Papaver somniferum*, the other species growing wild. This accounts for the lack of uniformity, both in appearance and composition, of the herbs. As drying and processing is done in the open it is less expensive than in Holland, but the author does not consider that Yugoslavian will seriously compete with Dutch products, owing to the higher quality of the latter.

1707. Broker, R., and Bhat, J. V.
Riboflavin and thiamine contents of gums.
Curr. Sci., 1953, **22**: 343, bibl. 3.

Data are presented on the riboflavin and thiamine content of several gums, which are used medicinally in India. High riboflavin contents were recorded for the following gums in γ/g.: Babul (*Acacia arabica* 79·6); Palas (*Butea monosperma* 138·8); Semala (*Bombax ceiba* 178·6); Talu (*Acacia* sp. 78·6). Semala also had a high thiamine content (24·28 γ/g.).—St. Xavier's Coll., Bombay.

1708. Špilenja, S. E.
The change of properties in medicinal plants resulting from vegetative hybridization. [Russian.]
Agrobiologija, 1951, No. 6, pp. 116-21, illus.

When *Atropa belladonna* was grafted on *Datura ceratocaula*, *Hyoscyamus niger* on *A. belladonna*, *D. inermis* on *D. stramonium* and *D. stramonium* on *D. inermis*, the resultant plants showed differences in alkaloid content when compared with the plants from which the grafts were taken. F_1 seedlings from the grafted plants showed similar changes, those from *D. stramonium* on *D. inermis* having a 30% higher alkaloid content than their parents. Morphological changes that occurred as a result of grafting are noted and illustrated.

1709. Špilenja, S. E.
The effect of the duration and intensity of light on the alkaloid content of *Hyoscyamus niger* and *Atropa belladonna*. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **91**: 1401-4, bibl. 3.

Analyses were made of dried leaves of *H. niger* and *A. belladonna* plants given full day light, short-day treatment (10 hrs) for one month early in the season and when the plants began to flower, and shading. The highest percentage of alkaloids was found in both plants during blossoming irrespective of whether it occurred during the normal time, was postponed by the early short-day treatment or was interrupted by the late short-day treatment and then renewed. Shading with muslin reduced both growth and alkaloid synthesis.

1710. Charles, A.
The respiratory fluctuations of starving detached leaves.
New Phytol., 1954, **53**: 81-91, bibl. 11.

Experiments show very marked differences in the respiration curves of starving leaves [of *Atropa belladonna*], the differences being caused by a slight modification of procedure designed to eliminate bacterial contamination. Bacteria are infiltrated into leaves and are found to cause a hump in the respiration curve similar to one found in previous experiments and then

* Now published in England.

regarded as physiological. The effects of antibiotics on starving leaves are examined. They tend to delay both yellowing and the senescent rise in respiration, being most effective if administered early. The need for early administration of antibiotics, if marked retardation of yellowing is to be obtained, seems to suggest deleterious bacterial effects on the leaf cells well before yellowing appears. A possible interpretation of experimental results is given, and a bacterial explanation of respiratory fluctuations is discussed. [Author's summary.]

1711. Barltrop, J. A., and Jeffreys, J. A. D.
Curare and related topics. Part I. A preliminary examination of *Chondrodendron limaciifolium*.
J. chem. Soc. Lond., 1954, pp. 159-64, bibl. few in text, illus.

The plant is used by certain South American Indians as an ingredient of curare, but, although it contains highly toxic materials, it does not possess any curare-active alkaloids. A preliminary investigation of its alkaloids, which include *iso*chrondrodenine and 2 new non-quarternary bases, is reported.

1712. Chaudhuri, R. H. N.
Effect of drying by different methods on the alkaloidal content of *Datura metel* Linn.
J. sci. industr. Res., India, 1953, **12B**: 506.

No appreciable difference was found in the alkaloid content of the leaves of *Datura metel* dried in the sun, in the shade and in an oven (60° C.) in tests carried out at the Pharmacognosy Laboratory at the Indian Museum, Calcutta.

1713. Anon.
***Duboisia*: a new economic plant.**
Rural Res. C.S.I.R.O., 1953, No. 3, pp. 22-4, bibl. 3, illus.

Notes are given on *Duboisia* spp., the development of which as commercial sources of atropine and hyoscine took place during the second world war. Natural stands are limited, but a satisfactory method of vegetative propagation based on rooting green tip cuttings has been developed on an experimental scale.

1714. Wainstein, P.
Adaptación de la amapola medicinal en la provincia de Mendoza. **(Suitability of the opium poppy for the Mendoza province [of Argentina].)**
Idia, 1953, No. 65, pp. 10-11, bibl. 4.

Opium poppy cultivation in Argentina began in 1938. Trials to determine its possibilities in Mendoza took place in 1950 and 1951. In 1950 the capsule yield and morphine content for July-sown plants were about 1,700 kg. per ha. and 2·2% respectively compared with 900 kg. and 2·7% for August-sown plants [cf. *H.A.*, 24: 590]. In 1951 the figures for May-, July- and August-sown plants respectively were 950 kg. and 2·7%, 690 kg. and 2·6%, and 370 kg. and 2·3%. The great variation from year to year and season to season is attributed to the weather.

1715. Mühle, E.
Zikaden an Heilpflanzen. **(Leafhoppers as pests of medicinal plants.)**
Anz. Schädlingsk., 1953, **26**: 133-7, bibl. 10, illus.

Leafhoppers may cause serious damage to medicinal plants, especially balm (*Melissa officinalis*). White spots on the leaves are the first symptoms of attack and the plants eventually die from loss of chlorophyll if feeding continues. Dusting with DDT is recommended as soon as the symptoms appear, early treatment being essential in view of the effect that DDT has on the drug. Several species of the genera *Eupterix* and *Empoasca* are described.

1716. Fulling, E. H.
American witch hazel—history, nomenclature and modern utilization.
Econ. Bot., 1953, **7**: 359-81, bibl. 104, illus.

The aqueous extract of witch hazel (*Hamamelis virginiana*) twigs is used as a household liniment, while the more concentrated tannin-containing alcoholic extract from leaves and bark is compounded into styptic remedies.

1717. Špilenja, S. E.
Some data on the biology of development and dynamics of alkaloid accumulation in *Scopolia carniolica*. [Russian.]
Bot. Žurnal, 1953, **38**: 579-81, bibl. 12.

Scopolia carniolica develops best in shade, hence it is recommended for growing between rows of woody plants or large medicinal plants. The maximum alkaloid accumulation coincides with the beginning of flowering which occurs in the Leningrad district at the end of May and early June. Harvesting of the plants for the provision of medicinal raw materials can be done from the time of maximum alkaloid accumulation till the leaves begin to turn yellow.

Essential oils.

(*See also* 1077, 1742f, n, 2078e, f.)

1718. Mariotti, A.
La culture du géranium rosat en Algérie. **(Geranium cultivation [for essential oil] in Algeria.)**
Inf. agric., Oct. 1952, pp. 1-7, from abstr. in *Agron. trop.*, 1953, **8**, No. 8-273.

The crop is grown on the poorest soils in the Mitidja area on a 5-year rotation, provides 2 harvests a year, and gives 20–40 tons of stalks and leaves per ha. There are 2 varieties. Parasites, except orobanche, and diseases cause little damage.

1719. Horner, C. E.
Methods of evaluating severity and control of mint rust.
From abstr. in *Phytopathology*, 1953, **43**: 587-8.

Quantitative analysis revealed that yield losses of peppermint caused by *Puccinia menthae* were due primarily to the destruction of oil glands on leaves by erupting uredinial sori and secondarily to leaf drop. A method of evaluating disease severity consisted of establishing 4 disease classes based on 0, 0–5, 6–25 and 26–50% reduction in oil gland numbers per unit area of leaf surface.

Fibres.

(*See also* 1076, 1917.)

1720. Anon.
Development of Nigerian fibres.
Nigeria Trade J., 1954, **2**: 20-2.

Fibres at present under investigation include coconut, *Clappertonia filicifolia*, *Sida cordifolia*, monkey banana (*Musa enseta*), and ramie.

1721. Srinivasan, M., and Bhatia, I. S.
The carbohydrates of *Agave vera cruz* Mill. 2. Distribution in the stem and pole.
Biochem. J., 1954, **56**: 256-9, bibl. 6.

The make-up of carbohydrates of the stem and pole of *Agave vera cruz* has been determined quantitatively with the aid of paper chromatography. As previously reported, fructosans form the major fraction and are most highly concentrated in the stem. The base of the pole has a carbohydrate make-up exactly analogous to that of its lower contiguous section, the stem. Moving upwards along the pole, the picture changes sequentially: first fructosans disappear, then their intermediates, leaving only fructose, glucose, and sucrose. On the other hand, in the topmost section of the pole, the seat of flower-head and bulbil formation, the fructosans and their intermediates reappear; the entire picture is in fact similar to that of the carbohydrates in the stem. [Authors' summary—see also *H.A.*, 23: 3270.]

1722. Anon.
Fabric from canna fibre.
Agric. Gaz. N.S.W., 1953, **64**: 624, illus.

From the light yellow varieties of canna, using the full stalk (up to 5 ft. in length) a New South Wales company has succeeded in producing an unwoven fabric for use as a substitute for jute fabrics, for underfelts, carpet backing, and many packaging materials. The process obviates the necessity of fully decorticating the canna stalks, and strong flexible fabric is obtained without spinning and weaving. The weight and strength of the fabric is determined by the number of crossed fibres or plies used in the material. The fibre is pressed and the canna resins bind the fibres together. The fabric can be proofed against fire and water. Coastal waste land is suitable for canna growing.

1723. Cumber, R. A.
Die-back condition of phormium seedlings used in yellow-leaf investigation.
N.Z. J. Sci. Tech., Sect. A, 1953, **35**: 270-2, bibl. 5, illus.

A description is given of a sudden die-back disease of phormium seedlings which appears to be distinct from the yellow-leaf virus disease transmitted by *Oliarus atkinsoni*. This die-back disease may be of fungal origin and was probably responsible for certain anomalous deaths in the original work on yellow-leaf disease [see *H.A.*, 23: 4390].

1724. Verduyn, H. A.
Ramie, mogelijkheden voor cultuur en verwerking op Sumatra. **(Ramie, possibility of cultivation and extraction in Sumatra.)** [English and Indonesian summaries ½ p. each.]
Bergcultures, 1953, **22**: 483-96, 499-509, bibl. 22, illus.

An account is given of the culture, decortication, degumming and commercial value of ramie. Conditions on the east coast of Sumatra are considered very suitable for the production of this crop and the development of a ramie industry there is urged.

1725. Chavancy, A.
Ramie. [French.]
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 83-96, illus.

Experimental culture of ramie (*Boehmeria nivea*) began at Blao, Viêt-Nam, in 1950. Research has included varietal, processing and cultural trials. In the cultural trials plants growing at 0·35×0·70 m. were thinned to 3, 6, and 9 stalks and left unthinned; yield of fibre and stalk length were less in the thinned plants. General conclusions were that ramie grows well in the locality on suitable sites and soils and requires abundant organic and mineral fertilization.—Centre d'Experimentation agronomique de Blao.

1726. Gangstad, E. O., Joyner, J. F., and Seale, C. C.
Fiber crop investigations. Sansevieria.
A.R. Fla agric. Exp. Stats 1951/52, p. 211.

In an NPK trial the yield of fibre from sansevieria growing in a fine sand was increased significantly by N and K. Grass weeds in sansevieria were most effectively controlled by CMU; 2,4-D, dinitro phenol and potassium cyanate also controlled certain weeds without injury to the sansevieria.

Hops.

(*See also* 2098.)

1727. Crnko, J.
Adaptación del lúpulo en Mendoza. **(Suitability of the hop for Mendoza.)**
Idia, 1953, No. 67, pp. 13-21, bibl. 20, illus.

Three hop varieties were grown experimentally for 4 seasons in Mendoza Province, Argentina, to determine the suitability of the crop for the area. Growth was satisfactory. Yields did not exceed 500 kg. dry cones per ha. but could be improved by using better varieties and by adequate fertilization. Notes are given on the drying, storage and chemical composition of the cones.

1728. Anon.
Institute of Brewing hop trials: Wye variety 1951 crop.
J. Inst. Brew., 1954, **60**: 5-11.

Eleven breweries have co-operated in large-scale commercial spring and autumn trials of the four new hop varieties, Sunshine, Early Choice, Keyworth's Early and Keyworth's Midseason, the two last being wilt-resistant varieties. Physical examination of these hops on receipt led in general to satisfactory reports, and there were few suggestions of important deterioration during non-refrigerated storage from April to November. Some loss of alpha-resin was noted during the storage period, especially with the wilt-resistant varieties; in three cases, total soft resins were lost at a similar rate from experimental hops and controls, but Keyworth's Midseason lost total soft resin at a somewhat greater rate. In general, the four hops were not favoured for dry hopping, but interest was found in them for copper use in blends of 25–50% with conventional types. Early Choice found most favour for copper use, and some brewers could use all four at suitable times and in suitable blends; there were, however, some unfavourable comments. [Author's summary.]

1729. Keller, K. R.
The effect of spacing and number of vines on yield of strobiles in hops.
Agron. J., 1953, **45**: 552-4, bibl. 5.

The effect of spacing and number of vines per plant on yield of strobiles in the variety, Late Clusters, was investigated during 1951 and 1952 in a hop yard near Corvallis, Oreg. The results from the analyses of the data indicated that, as the spacing interval between plants within rows decreased, the yield per acre increased regardless of whether the number of vines per plant or number of vines per plot remained constant. The results from the analyses of the data also suggested that the mean yield in pounds of hops per plant increased as the spacing interval increased where (1) the number of vines per plant and (2) the number of vines per plot were held constant. The training of 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15 vines per plant had no effect on the mean harvest yield per plot in the variety Late Clusters. [Author's summary and conclusions.]

1730. MacWilliam, I. C.
Chemistry of hop constituents. V. Hop pectin.
J. Inst. Brew., 1953, **59**: 480-5, bibl. 30.

After preliminary extraction of hops with organic solvents and with cold aqueous acetone, pectin was extracted from the residue in two portions, using first boiling water and then dilute ammonium oxalate solution. The purity of the fractions was determined by estimating the sugars produced after enzymic hydrolysis. Different varieties of hops were found to contain between 1 and 2% of pectin. [Author's summary.]

1731. Howard, G. A., and Tatchell, A. R.
Further observations on the occurrence and isolation of cohumulone.
J. Inst. Brew., 1953, **59**: 491-8.

The recent discovery of cohumulone as a constituent of the alpha-soft resin of hops has been confirmed. Examination of numerous varieties of hops indicates that cohumulone is widely distributed and that in the majority of cases it forms 5–10% of the alpha-soft resins. The alpha-soft resins of Brewer's Gold and Bullion hops probably contain 30–40% of cohumulone. The isolation of cohumulone is described. [Authors' summary.]

1732. Abson, J. W., Saleh, M. S. E., and Walker, T. K.
Further observations on the δ-resin of hops and a method for its estimation.
J. Inst. Brew., 1954, **60**: 42-6.

Thirteen different hop samples all contained delta-resin, in amounts varying from about 0·6% in some three-month-old hops to about 4% in certain hops which had been stored in warehouse for periods of eighteen months to two years. A method for the assay of delta-resin in hops is described. [From authors' abstract.]

Rubber plants.

(*See also* 1742i, m, o.)

1733. Guseva, A. R., and Borihina, M. G.
The accumulation of gutta percha and resin in the leaves of *Eucommia* during growth. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **93**: 871-3, bibl. 7.

Eucommia [*ulmoides*?] is an important source of gutta percha. Analyses made in 1952 showed that latex formation in the leaves was slow at first, increased in September when 30% to 50% of the total latex content was accumulated and then remained constant till the end of the season. The resin content of the leaves was highest from June till September and then decreased. Periodical determinations were also made of ash, Si, Ca, K, P, total N and aucubin contents.

Seed oils.

(*See also* 1742b, j, 2100.)

1734. Skellon, J. H., and Spence, J. W.
The seed oil of *Ammi visnaga* as a source of *cis* octa-dec-6-enoic acid (petroselinic).
Chem. Ind. Lond., 1953, No. 3, p. 75, bibl. 3.

The seed oil of *Ammi visnaga*, the Mediterranean umbelliferous herb, was investigated as a result of a suggestion that it might be an alternative to parsley seed as a source of petroselinic acid. It yielded 33% of the acid by ordinary methods of isolation.

1735. de Segura, C. B.
La higuerilla: posibilidades de su cultivo en el Peru. **(Possibilities for growing the castor bean in Peru.)**
Circ. Estac. exp. agric. La Molina **66**, 1953, pp. 15, bibl. 8, illus.

The castor bean (*Ricinus communis*) has long been grown commercially in Peru and there is an oil extraction plant. A plea is made for expanded cultivation by large and small farmers. Notes are given on varieties, climate and soil, cultural practices, yields and bean analyses.

1736. Webb, D. v. V.
An ecological study of the wattle looper.
Fmg S. Afr., 1953, **28**: 385-90, bibl. 10, illus.

The larvae of the wattle looper, *Achaea lienardi*, are apt to do serious damage to black wattle, castor oil plants, citrus, eucalyptus and several indigenous trees. The adult moth damages a wide variety of fruits. Studies are reported on the life cycle and distribution of the moth and the periodicity of outbreaks, and on successful control experiments with DDT and toxaphene against larvae attacking castor oil plants.

1737. Pereira Pinto, G.
O óleo de patauá (seu estudo químico). **(The chemistry of patava oil.)** [English summary ½ p.]
Bol. téc. Inst. agron. Norte, Belém **23**, 1951, pp. 65-77, bibl. 8.

Patava oil from the palm *Jessenia batauá* is very similar to olive oil and can be used for the same purposes.

1738. Pereira Pinto, G.
Contribuição ao estudo químico do sêbo de ucuúba. **(A contribution to the chemical study of ucuuba oil.)** [English summary 1 p.]
Bol. téc. Inst. agron. Norte, Belém **23**, 1951, pp. 1-63, bibl. 10, illus.

Ucuuba oil is derived from several species of the myristicaceous tree *Virola*, notably *V. surinamensis*, growing in the Amazon valley. Notes are given on the chemistry of the oil of this species; the oil is chiefly

important as the source of trimyristine and myristic acid.

Tannins.

(*See also* 1742c, 2119m.)

1739. Budaga Rao, J., and Nayudamma, Y.
Note on the acid-salt contents of some important Indian vegetable tanning materials.
J. sci. industr. Res., India, 1953, **12B**: 568-9, bibl. 7.

The constituents of vegetable tanning materials are given for a number of crops, namely *Anogeissus latifolia, Terminalia chebula, Caesalpinia coriaria, Cassia auriculata, C. fistula, Cleistanthus collines, Ceriops roxburghiana, Acacia leucophloea, Acacia arabica, Acacia mollissima* and *Briguiera gymnokahiza.*

1740. Mathew, E. C., and Das, B. M.
Hide powder method of preparing pure tannin.
J. sci. industr. Res., India, 1953, **12B**: 569-70, bibl. 10.

Notes are given on the use of this method for the preparation of pure tannin from *Cassia auriculata* bark.

Sundry plants.

1741. Clopton, J. R.
Osage orange antioxidant.
J. Amer. Oil Chem. Soc., 1953, **30** (4): 156, from abstr. in *Econ. Bot.*, 1953, **7**: 381.

Fruits of the osage orange, *Maclura pomifera* [Moraceae], up to 3 lb. in weight, contain about 10% of weight of an antioxidative component that may be of commercial value in preventing rancidity in oil-soluble vitamin concentrates, cosmetics, pharmaceuticals, lubricating greases and many other substances subject to oxidative deterioration.

Noted.

1742.

a Aspinall, G. O., and others.
The mannans of ivory nut (*Phytelephas macrocarpa*). Part I. The methylation of mannan A and mannan B.
J. chem. Soc. Lond., 1953, pp. 3184-8, bibl. 15.

b Bheemeswar, B., and Sreenivasaya, M.
Studies on ribonuclease: Part I—Preparation and properties of ribonuclease from castor bean (*Ricinus communis* Linn.).
J. sci. industr. Res., India, 1953, **12B**: 529-31, bibl. 12.

c Briggs, L. H., Jacombs, F. E., and Nicholls, G. A.
The colouring matters of the bark of *Rhamnus alaternus* L.
J. chem. Soc. Lond., 1953, pp. 3069-72, bibl. 14.

d Chakravarti, D., Chakravarti, R. N., and Chakravarti, S. C.
Alkaloids of *Glycosmis arborea*. Part I. Isolation of arborine and arborinine: The structure of arborine.
J. chem. Soc. Lond., 1953, pp. 3337-40, bibl. 4.
Leaves of *G. arborea* are used in Indian medicine. [See also *H.A.*, 23: 4370.]

e Chládek, M., Rod, J., and Baňoch, Z.
Orientační metoda stanovení objemu silic při slechtění siličnatých rostlin. (**A method of estimating essential oil content when breeding medicinal plants and herbs.**) [Russian and German summaries.]
Sborn. čsl. Akad. zeměd. Věd., Ser. A, 1953, **26**: 213-20, bibl. 6, illus.

f Corbett, R. E., and Hanger, W. G.
The volatile oil of *Metrosideros umbellata*.
J. Sci. Food Agric., 1953, **4**: 508-11, bibl. 15.
M. umbellata is a New Zealand tree.

g Correll, D. S.
Vanilla—its botany, history, cultivation and economic import.
Econ. Bot., 1953, **7**: 291-358, bibl. 66, plus 9 pp. of additional literature, illus.
A revision of a paper published in 1944 [see *H.A.*, 15: 1286].

h Erasmus, J. C.
The cultivation of chicory.
Fmg S. Afr., 1953, **28**: 331-4, bibl. 1, illus.
In South Africa, see also abstract 1701.

i Gerstel, D. U., Hammond, B. L., and Kidd, C.
An additional note on the inheritance of apomixis in guayule.
Bot. Gaz., 1953, **115**: 89-93, bibl. 4.

j Gupta, S. C., and Aggarwal, J. S.
Solvents for the extraction of oil from kamala [*Mallotus philippinensis*] seeds.
J. sci. industr. Res., India, 1953, **12B**: 545-7, bibl. 9.

k Kebrle, J., and others.
Curare alkaloids from calabash.
Helv. chim. Acta, 1953, **36**: 102-21, from abstr. in *Brit. Abstr., A.II*, 1953, pp. 819-20.

l Krishna Murthy, D. V., and Narasimha Rao, P. L.
Antibiotic principles of *Garcinia morella*: III—Moreollin—A new pigment.
J. sci. industr. Res., India, 1953, **12B**: 565-6, bibl. 6.

m Meeks, J. W., and others.
Determining rubber hydrocarbon in rubber-bearing plants.
Analyt. Chem., 1953, **25**: 1535-8, bibl. 16.
In guayule.

n Narodny, L. H.
A preliminary examination of the possibility of using chromatography to evaluate the quality of some freshly distilled bay oils in Dominica, B.W.I.
Perfum. essent. Oil Rec., 1953, **44**: 282-4.
From pimento (*Pimenta racemosa*).

o NAVAŠIN, M. S., AND GERASIMOVA-NAVAŠINA, E. N.
Tetraploidy and tetraploid kok-saghyz. [Russian.]
Agrobiologija, 1951, No. 6, pp. 102-9, bibl. 5.
Particularly the production of tetraploid kok-saghyz [see also *H.A.*, 12: 1414] by colchicine treatment.

p PETELOT, A.
Les plantes médicinales du Cambodge, du Laos et du Viêt-Nam. Tome II. (**Medicinal plants of Cambodia, Laos and Viêt-Nam. Vol. II.**)
Arch. Rech. agron. pastor. Viêt-Nam **18**, 1953, pp. 284.
Caprifoliaceae to Plantaginaceae.

q PORTÈRES, R.
Le potential de variation clonal de *Vanilla tahitensis* J. W. Moore. (**Clonal variation likely to occur in *Vanilla tahitensis*.**)
Agron. trop., 1953, **8**: 639-40, bibl. 8.
A new form, *V. tahitensis* var. *tihita*, described.

r SNOW, R.
Phyllotaxis of flowering teasels.
New Phytol., 1954, **53**: 99-107, bibl. 4, illus.

s WALZEL, G.
Vitamin C in *Cuscuta*.
Protoplasma, 1952, **41** (2): 260-2, from abstr. in *Humus*, 1953, **9** (10): 35-6.

FLORICULTURE.

General.

(*See also* 1064, 1065, 1078, 1132-1142, 1296, 1381, 1399, 1502, 1517, 1813o, p, q, r, v, 2080, 2098, 2104, 2119h.)

1743. GARTHWAITE, J. M.
Work at the flower department at Luddington.
Rep. Luddington exp. Hort. Stat. for 1952, 1953, pp. 69-76.
Of 3 methods of grafting used to test dahlias for virus infection, grafting on to a cutting already rooted was found the most convenient. Twenty-four varieties of dahlia suitable for cut flowers are listed. Various fertilizer treatments were applied to gerbera, sulphate of ammonia at 4 oz. per sq. yd giving the largest number of high quality blooms. The best delphinium varieties for marketing were Blue Bees, Persimmon and William Richards. Comparing methods of raising plants of Early Feltham wallflowers, it was found that plants raised by direct sowing produced flowers much earlier and with much longer stems than did plants transplanted from nursery beds.

1744. FRIESDORF.
Tätigkeitsbericht 1952 der Gärtnerischen Versuchsanstalt zu Friesdorf/Bad Godesberg. (**24th Annual Report of the Horticultural Research Station of Friesdorf/Bad Godesberg for 1952**), pp. 80, illus.
A. *Variety trials with flowers.* I The forcing of German- and Dutch-grown tulip bulbs, pp. 3-27. The best German bulbs are now of a quality equal to that of the best Dutch bulbs, but demand in Germany still exceeds the supply of home-grown tulips.—II and III. Cineraria and begonia variety trials, pp. 28-32.—IV. Cultural and variety trials with chrysanthemum, pp. 32-46. The cultural part deals with the training to one stem of varieties with medium-sized flowers and with alterations in propagation technique necessitated by this practice. V. Results of illumination trials, pp. 47-63. The response to temporary or prolonged artificial illumination of various types is recorded for cyclamen, *Columnea kewensis*, *Kalanchoe blossfeldiana*, *Peperomia arifolia* and *P. magnolifolia*, *Primula obconica* and *P. kewensis*, begonia, cineraria, *Aechmea fasciata*, *Epiphyllum truncatum*, *Asparagus plumosus*, pelargonium, calceolaria, chrysanthemum and tomato.—VI. The construction and use of simple glasshouses to extend the season for cut flowers, pp. 63-8.—VII. Changing the soil pH in some pot plants during the growing season, pp. 68-70.—B. *Equipment and implements*, pp. 71-9. Results are reported of the following among other trials: Dyes for shading lights; the use of infra-red rays in seed germination; the sub-irrigation of pot plants, confirming earlier findings [*H.A.*, 23: 3308]; and labour studies in flower growing.

1745. CALVINO, G. E. M.
Relazione dell'attività tecnica svolta della Stazione Sperimentale di Floricoltura nell' anno 1952. (**Annual Report of the Floricultural Experiment Station at San Remo for 1952.**) [English summary 6 lines.]
Ann. Sper. agrar., 1954, Vol. **8**, No. 1, *Suppl.* pp. xiii–xli.
A brief account is given of work done at the Orazio Raimondo Floricultural Experiment Station in 1952, namely breeding and selection of carnations, roses, freesias, gladioli and primulas, experiments on the control of pests and diseases, e.g. red spider on carnation, tortrix larvae on cut flowers, carnation rust, rose rust, and the introduction of South African and Australian plants for winter flowering.

1746. FJÄDERHANE, A. M.
Arbetsstudier i trädgårdsodlingen. (**Time studies in horticulture.**)
Medd. Alnarpsinst. trädgårdsekon. Byrån **15**, 1953, pp. 37.
For a brief outline of the time-study scheme see *H.A.*, 23: 1434. In this bulletin 14 pp. are devoted to several operations in tomato culture, especially picking, and 9 pp. to the budding and tying of roses. Man-hours needed in the cultivation of carnations, freesias and chrysanthemums and in lawn mowing are among other inquiries conducted in less detail.

1747. EALY, R. P.
Perennial flowers and bulbs for Oklahoma.
Bull. Okla. agric. Exp. Stat. **B-407**, 1953, pp. 50, illus.
In addition to general advice on arrangement, propagation, planting, maintenance, and pest and disease control, this bulletin gives short notes on species of

herbaceous perennials and bulbs that have been tested over 5 years and found adaptable or otherwise to conditions in Oklahoma.

1748. (Mott, R. C.)
Saturated air+fungicide=seed germination success.
Flor. Exch., 1953, **121** (25): 13, illus.

A method of germinating delicate or expensive seeds of ornamental plants in covered Mason jars containing a fungicide-treated growing medium is described. The technique, first used with seeds of 5 different rhododendron hybrids was later tested on some 35 other plants with equal success. [See also *H.A.*, 24: 619.]

1749. Nelson, P. E., and Wilhelm, S.
Thermal death range of *Verticillium albo-atrum*.
From abstr. in *Phytopathology*, 1953, **43**: 589.

The minimum lethal temperatures in hot water (10-minute exposure) and the survival periods in a dry atmosphere at various temperatures for different phases of a rose and tomato isolate of *Verticillium albo-atrum* are given. Infected rose and geranium cuttings failed to grow after exposure to several temperatures lethal to the pathogen.

1750. Hartzell, A.
The imported long-horned weevil.
Contr. Boyce Thompson Inst., 1953, **17**: 334-6, bibl. 4, illus.

Rose, ivy, Virginia creeper, lespedeza and African marigold are the favoured hosts among many ornamental plants attacked by the leaf-eating weevil *Calomycterus setarius*. Rotenone will kill the beetles but control measures have not yet been perfected.

1751. Carra, —., Florenchie, —., and Théau, —.
Conservation des fleurs par le froid en 1953. **(Cold storage of cut flowers in 1953.)**
Rev. hort. Algér., 1953, **57**: 265-8.

A study was made at the Jardin d'Essai at Hamma of the behaviour of cut flowers (tulip, arum, *Ixia maculata*, *Bebiana plicata*, rose and gladiolus) at room temperature after 1, 2 and 3 weeks' storage at 2·5° C. in cellophane wrappers. In general all except rose withstood 1 week's cold storage well but not the longer periods.

Annual and herbaceous plants.

(*See also* 1127, 1608, 1647p, q, 1697d, 1813c, d, h, i, m, s, t.)

1752. Weijel, M. L.
De verwelkingsziekte van de aster, *Callistephus chinensis* (L.) Nees, veroorzaakt door *Fusarium* spp. **(Wilt disease of aster, *Callistephus chinensis*, caused by *Fusarium* spp.)**
Jaarb. Plziekt. Dienst Wageningen 1951/52, 1953, pp. 184-7, being *Meded.* **120.**

It has been definitely proved that *Fusarium* spp., which may cause a wilt disease of asters, can be seed-borne, although the percentage of infected seed is small. As other fungi which attack aster seedlings are also seed-borne, seed disinfection is necessary. Promising results were obtained by soil disinfection with chloropicrin for control of the disease in late asters, but as the material is expensive further trials are needed. It is emphasized that resistant American varieties, especially when grown for seed, should be grown on infected soil in order to maintain resistance.

1753. Monselise, S. P.
Growth analysis of carnation grown in full sun and under cover.
Palestine J. Bot. (*R*), 1953, **8**: 220-2.

Carnation plants protected from the very strong radiation prevailing during the summer in Israel (grown in 40% light) did not react favourably but developed more slowly as the result of reduced carbon assimilation which was not counterbalanced by slightly larger assimilation surfaces. The net assimilation rate, relative growth rate and leaf weight/total weight ratio in shade plants in the fortnight during which blooming began were 6·6, 2·801 and 0·424 compared with 9·77, 3·683 and 0·377 in sun plants. The figures for a subsequent fortnight during which the plants were in full bloom were 1·923, 0·635 and 0·330 for shade plants and 3·703, 1·193 and 0·322 for sun plants. The number of flowers produced by shade plants ($8·3 \pm 1·3$) was significantly less than that produced by sun plants ($27·9 \pm 4·7$).

1754. Baker, K. F., and Davis, L. H.
Greasy blotch of carnation.
From abstr. in *Phytopathology*, 1953, **43**: 585.

Notes are given on greasy blotch (*Zygophiala jamaicensis*), an unusual disease which in 1952-53 severely injured several carnation varieties growing in San Francisco Bay glasshouses under conditions of high humidity.

1755. Williamson, C. E.
Methyl bromide injures carnations.
Bull. N.Y. St. Flower Grs, 1953, No. 100, p. 4.

Investigations have shown that the use of methyl bromide fumigants on most soils and under many conditions may result in serious injury to carnations subsequently planted in those soils. Other fumigants such as EDB and CBP may cause similar injury. Methyl bromide can, however, be safely used to sterilize sand in the propagation benches.—Cornell Univ. [See also *H.A.*, 24: 636.]

1756. Kraus, E. J., and Garren, R., Jr.
Chrysanthemums for home and garden.
Stat. Bull. Ore. agric. Exp. Stat. **534,** 1953, pp. 58, illus.

This bulletin describes the classes of chrysanthemum, the structure of the flowers of different types, methods of propagation by seed, division and cuttings, various aspects of cultivation and the control of pests and diseases.

1757. Lauer, E.
Frostschäden an Blüten von Freiland-Chrysanthemen. **(Frost damage to flowers of outdoor chrysanthemums.)**
Gartenwelt, 1954, **54**: 43-4, illus.

Observations at Weihenstephan showed that chrysanthemum varieties having a light flower colour are more susceptible to injury by frost than are dark-coloured varieties, irrespective of the fact that the damage in the latter is less conspicuous. Buds were found to be

tenderer than open flowers and double flowers tenderer than single. A comparison of osmotic values suggests that a relationship exists between frost resistance and osmotic pressure, the values for white (tender) and copper-coloured flowers, for instance, being 15·75 and 20·44 atm. respectively or for buds (tender) and open flowers 11·20 and 18·00 atm. respectively. Varieties found especially frost susceptible and resistant at Weihenstephan are listed.

1758. Wilhelm, S., and Ferguson, J.
Soil fumigation against *Verticillium albo-atrum.*
Phytopathology, 1953, **43**: 593-6, bibl. 9, illus.

This paper is an expansion of the abstract to which *H.A.*, 22: 1613 relates. In field tests which followed the can tests, verticillium wilt in chrysanthemum was reduced, on a basis of production of marketable flowers, from 56% to 1·04% by a 3 c.c./sq. ft (35·3 gal./acre) application of commercial Larvacide, to 17·4% by a 4 c.c./sq. ft (46 gal./acre) application of commercial CBP-55, and, on a basis of infected plants, from 100% to 9·1% and to 76·4 by the Larvacide and CBP-55 respectively.—Dep. Plant Path., Univ. Calif., Berkeley.

1759. Stone, L. E. W.
Observations on the occurrence of the eel-worm *Pratylenchus pratensis* Filipjev in delphinium roots.
Ann. appl. Biol., 1953, **40**: 742-9, bibl. 5, illus.

The severity of a delphinium root-rot appeared to be correlated with the soil population of *P. pratensis* which was found associated with lesions on the roots. Delphiniums grown on infested soils fumigated with methyl bromide had more vigorous root systems containing fewer eelworms than those grown on untreated soils. D-D also showed promise for the control of *P. pratensis*.
J.S.

1760. Hellmers, E.
Bacterial leaf spot of pelargonium (*Xanthomonas pelargonii* (Brown) Starr & Burkholder) in Denmark.
Trans. Danish Acad. tech. Sci. **4**, 1953, pp. 40, illus., from abstr. in *Rev. appl. Mycol.*, 1953, **32**: 678.

In August, 1951, pelargoniums in a Copenhagen nursery were severely attacked by a bacterial disease caused by *Xanthomonas pelargonii*. *Pelargonium domesticum*, *P. hortorum*, and *P. peltatum* were susceptible to the disease, while *P. graveolens* was immune. The bacterium causes leaf spotting and a dry, brown stem rot, whereas *Pythium* stem rot (caused by *P. debaryanum*) is a greenish black soft rot. The principal sources of infection are cuttings taken from diseased plants. Control is effected by spraying with 0·1% mercusan or 1% bordeaux mixture, by keeping plants as dry as possible, and by cutting off and destroying all diseased tissue.

1761. Munnecke, D. E.
Bacterial stem rot of *Pelargonium hortorum.*
From abstr. in *Phytopathology*, 1953, **43**: 588-9.

An account is given of the symptoms and spread of bacterial stem rot (*Xanthomonas pelargonii*) which limits field production of geraniums in Southern California. Field experiments are in progress to control the decrease by selection of stock plants, field rotation, and sanitation in harvesting and handling of cuttings.

1762. McQuade, H. A.
Induction of parthenocarpy in *Petunia.*
Ann. Mo. Bot. Gdn, 1952, **39**: 97-112, from abstr. in *Brit. Abstr. A.III*, 1953, columns 721-2.

Parthenocarpy was induced by 2 (*Nicotiana affinis* and *Salpiglossis* sp.) of 14 types of pollen placed on *Petunia* flowers, by 2,4-D in lanolin (1 in 50–1,000), X-irradiation of ovaries, and X-irradiated pollen applied to stigmas.

1763. Tschermak-Seysenegg, E.
Über die Blüh-und Befruchtungsverhältnisse des Usambara Veilchens. (**Flowering and pollination in saintpaulia.**)
Bodenkultur, 1953, **7**: 109-11.

The failure of the anthers to burst or their particular manner of pollen discharge causes sterility in most saintpaulia flowers. The author describes a simple method of accomplishing artificial pollination.

1764. Pesante, A.
Segnalazione di una ruggine nuova della statice (*Statice sinuata* L.). (**A new rust of *Statice sinuata*.**)
Nuovo G. bot. ital., 1952, **59**: 561-4, bibl. 3, illus.

The new disease, found in plants growing at the Stazione Sperimentale di Floricoltura, Sanremo, affects all epigeal parts.

1765. de Wet, J. M. J.
Doubleness in stocks.
Fmg S. Afr., 1953, **28**: 303, 320.

Describes selection of seedlings of commercial strains to produce maximum numbers of double flowers.
J.S.

1766. Bollow, H.
Die Gallmücke *Dasyneura affinis* Kieff. als Schädling der Veilchen. (**The gall midge *Dasyneura affinis* as a pest of violets.**)
Weitere Beobachtungen über die Veilchenblatt-Gallmücke. (**Further observations on *D. affinis* on violet leaves.**)
PflSchutz, München, 1952, **4**: 32, 82, from abstr. in *PflSch. Ber. Wien*, 1953, **11**: 124.

Leaf infestation of violets by *Dasyneura affinis*, as observed in many localities in Bavaria, affected flower production adversely.

Bulbs, tubers, etc.

(*See also* 1435m, 1813c.)

1767. Ranasinha, G. O. W.
The tuberous begonia: its propagation and cultivation in Ceylon.
Trop. Agriculturist, 1953, **109**: 128-31, bibl. 3, illus.

Twenty-four varieties of tuberous-rooted begonia are listed that have been successfully grown under glass at the Botanic Gardens, Hakgala. Notes are provided on

propagation by seed and stem and leaf cuttings and on methods of cultivation.

1768. Porozov, A. K.
Something new in the cultivation of canna. [Russian.]
Sad i Ogorod, 1953, No. 11, pp. 76-8, illus.
The old accepted method of winter storage of cannas at 4–5° C. is unsatisfactory, resulting in up to 70–80% losses, but under an improved system of cultivation well developed mother plants produce 6–8 new plants each year. The cannas are lifted and divided in the autumn, are heeled in in the greenhouse, watered as required and kept at 12–15° C. The leaves are cut off progressively, the last of the old ones being removed as the new ones appear in early spring. The plants are then potted and placed in frames where they are hardened preparatory to planting out.

1769. Böhnert, E., and Mühlendyck, E.
Bekämpfung der Fusarium- Welke bei Cyclamen durch Desinfektionsmassnahmen. **(The control of fusarium wilt in cyclamen by soil sterilization.)**
Gartenwelt, 1954, **54**: 49-51, illus.
In recent years cyclamen wilt, caused by *Fusarium oxysporum* var. *aurantiacum*, has become very troublesome in the Berlin area. In experiments carried out in affected nurseries and at the Institut für Blumen- u. Zierpflanzenbau d. Technischen Universität Berlin-Charlottenburg, soil sterilization by steam, formaldehyde and chloropicrin reduced the percentage of infected plants from 35 to 4–5. Other methods of soil treatment tested proved less effective. In view of the apparent specialization of the fungus on cyclamen it is hoped to eradicate this wilt completely.

1770. Anon.
Temperatuurbehandelingen met *Freesia* en *Iris* Wedgwood. **(Temperature treatments for freesias and Wedgwood irises.)**
Meded. Proefst. Groent. Fruit. Glas, 1954, No. 1, p. 3, illus.
Trials were carried out in 1953 to determine the best storage temperature for freesia corms. Five varieties of freesia were used and the corms were stored at 31° C. for 9 to 17 weeks; some were then cooled at 13° C. for 2 or 4 weeks. All corms were then planted under glass on 1 September. Emergence of shoots and appearance of the inflorescence was earliest in the corms that had been cooled, 4 weeks of cooling being more effective than 2. The effect of length of storage at 31° C. was less marked. As harvesting is not yet completed final results cannot be given. Wedgwood irises could be picked within 2 months of planting when treated as follows: The bulbs, dug on 18 August, were stored for 14 days at 30° C. and were then kept at 9° C. until the flower initials had formed. They were planted in the glasshouse on 11 and 20 November.

1771. Jenkins, J. M., Jr., Haasis, F. A., and Ritcher, P. O.
Growing gladiolus in North Carolina.
Ext. Circ. N.C. agric. Ext. Serv. **373**, 1953, pp. 23, illus.
Aspects of gladiolus culture covered in this circular include soils and soil pH (about 5·5), manuring, varieties, planting, weed control with 2,4-D pre-emergence sprays, rotations, irrigation, cutting, grading and packing the flowers, digging and storing the corms, and the control of diseases, nematodes and insect pests. Information on manuring is limited but preliminary results of work at the Vegetable Research Laboratory, Wilmington, suggest that 1,000 lb. or more of a 3–3–9 fertilizer applied in one dose may be injurious. Split applications, each of 500 lb. or less, one before planting and the other just before spikes were produced, gave better results.

1772. Mason, C. M.
Hyacinth propagation: an unusual method.
Gdnrs' Chron., 1953, **134**: 228, bibl. 1, illus.
The technique, already described [see *H.A.*, 18: 1300], which permits rapid vegetative reproduction of hyacinths without destroying the parent bulbs gave promising results at Sutton Bonington.

1773. Brock, R. D.
Spontaneous chromosome breakage in *Lilium* endosperm.
Ann. Bot. Lond., 1954, **18**: 7-14, bibl. 16, illus.
Chromosome breakage and reunion was found to occur in the endosperm of *L. regale* and the hybrid variety Phyllis Cox. A sequence of abnormalities culminates in the failure of the endosperm and the death of the embryo. This sequence is probably of wide importance in the failure of interspecific hybridization.—John Innes hort. Instn.

1774. Gassner, G.
Frühtreiben durch Beizung mit quecksilberhaltigen Beizmitteln. **(Mercurial compounds for the forcing of bulbs.)**
Angew. Bot., 1953, **27**: 37-47, bibl. 10, illus.
The very marked stimulating effect of two mercurial seed disinfectants on the sprouting of rhizomes of lily of the valley is illustrated by a series of photographs taken in January, 4 months after the treatment. Both germisan (phenyl-Hg-pyrocatechol), which gave the more striking results, and ceresan acted over a wide range of concentrations in aqueous solutions applied for ½-hour, 2 and 4 hours. Three other mercurials tested proved less successful. It is suggested that the response of seed germination to mercurial compounds should also be studied.

1775. Anon.
The culture of the Chinese sacred lily in Hong Kong.
Food and Flowers, 1953, No. 3, pp. 39-47, bibl. 4, illus.
The sacred lily, *Narcissus tazetta* var. *orientalis*, holds a special place in the life of the Chinese community of Hong Kong. Propagation and forcing are among the aspects of its culture discussed.

1776. Staniland, L. N.
The use of chlorphenol in hot-water baths for the treatment of eelworm in infested bulbs.
Rep. Gulval Exp. Stat. 1950/51, 1953, pp. 55-6.

Incomplete control in the rigid wire mesh container method is due to the "wool" stage of the eelworm being very resistant to heat if not properly wetted. By the addition of a nematicide (0·1% chlorphenol) and a wetter-detergent to ensure proper wetting of the wool the time taken to kill eelworm at 110° F. is reduced to a little below 20 mins compared with 78 mins or longer in hot water alone.

1777. Sampson, R. E., and Ludwig, R. T.
The effectiveness of certain fungicides against *Botrytis tulipae* (Lib) Lind.
Canad. J. Bot., 1953, **31**: 531-6, bibl. 14, illus.

Comparisons *in vitro* show that thiram and ferbam were effective against *B. tulipae* at lower concentrations than either chloranil or vancide 51. Sodium *o*-phenylphenate probably has a similar mechanism of action. When applied to tulip bulbs, none of these chemicals was effective in controlling botrytis blight, probably because of their inability to penetrate the outer white bulb scale to reach deep-seated fungus mycelium. J.S.

1778. Veerman, J. A.
De behandeling van enkele gewassen in de klimaatschuur. **(The treatment of certain crops in air-conditioned sheds.)** [English summary 10 lines.]
Meded. Dir. Tuinb., 1954, **17**: 12-17.

Air-conditioned sheds, in which air exchange, temperature and humidity can be regulated separately [see abstracts 1135 and 1136], can be used for storage or temperature treatments of bulbs and onion sets, for the culture of mushrooms and for the fermentation of tobacco. The requirements of these various crops are dealt with in turn.

Lawns.

(*See also* 1813a, u, 2104.)

1779. Howell, W.
Grasses in towns.
Gdnrs' Chron., 1953, **134**: 90, 101.

Notes are given on the behaviour and adaptability of grass species and varieties used in both turfed and seeded lawns in towns in the U.K.

1780. Harris, J., and Chamblee, D. S.
Carolina lawns.
Ext. Circ. N.C. agric. Ext. Serv. **292**, revised 1953, pp. 12.

The main characteristics are described of the following grasses recommended for use in North Carolina lawns: common Bermuda (*Cynodon dactylon*), bluegrass (*Poa pratensis*), carpet grass (*Axonopus affinis*), centipede grass (*Eremochloa ophiuroides*), Italian ryegrass (*Lolium multiflorum*), tall fescue (*Festuca elatior* var. *arundinacea*), African Bermuda grass (*Cynodon transvaalensis*), and Manila and Japanese grasses (*Zoysia matrella* and *Z. japonica* strain Z-52). Notes are supplied on establishment and maintenance and on ground cover substitutes for grasses under dense shade.

1781. Stoutemyer, V. T.
Grass combinations for turfs.
Calif. Agric., 1953, **7** (12): 9-10, illus.

A Latin-square lay-out was used for comparative trials involving several new strains of bent grass, blue grass and Bermuda grass. The results suggest that by mixing certain cool season grasses with Bermuda grass it should be possible to provide lawns in southern California which keep in good condition throughout the year and resist invasion by weeds. [See also note 1813u.]

1782. Howell, W.
Stabilizing turf surfaces with bitumen.
Gdnrs' Chron., 1954, **135**: 64-5.

An effective way of re-establishing turf in areas subject to heavy wear is to sow the grass seed on a finely prepared, moist seed-bed, cover the area with about ½ in. of coarse gritty sand, spray the surface with bitumen at a rate of up to 1 gal. to 2 sq. yds, dust with fine sand and roll. Subsequent treatment is discussed and observations are made on grass mixtures and times for sowing.

1783. Kelsheimer, E. G.
Insects and other pests of lawns and turf.
Circ. Fla agric. Exp. Stats **S-42**, 1952, pp. 11, illus.

Control notes are given. The chief lawn grasses are St. Augustine, centipede and Bermuda. The chief insect pests are *Blissus leucoptorus*, *Nysius ericae*, *Pachyzancla phaeopteralis*, *Laphygma frugiperda*, leaf hoppers, grubs and mole crickets. The chief insecticides are DDT and chlordane.

1784. Sander, A. F.
New turf pests.
Agron. J., 1953, **45**: 631-2, illus.

Rhodes grass scale (*Antonia graminis*) and Ruth's scale (*Odonaspis ruthae*), first recorded in continental North America in 1942, have since been observed in most parts of Texas, Louisiana and Florida. Attack results in a gradual thinning of turf through reduction in the number and size of individual plants. The chief hosts of the commonest species, *Antonia graminis*, in addition to Rhodes grass, are Johnson grass, Para grass, Bermuda grass and St. Augustine grass. A third important scale is *Antonia parrotti*. Biological control holds out some promise but so far chemical control has not been satisfactory.

1785. Waite Agricultural Research Institute, Entomology Department.
Notes on insect pests of lawns.
J. Dep. Agric. S. Aust., 1953, **57**: 123-5, 127, bibl. 3, illus.

Notes are given on the lawn beetle (*Heteronycus sanctae-helenae*) and the mole cricket (*Gryllotalpa* spp.) which are both controlled by the application at 1 gal. per sq. yd of 1 gal. 20% DDT emulsion in 200 gal. water or 2 lb. 50% DDT dispersible powder per 100 gal. Application should be made in October and February against the former and in October against the latter. Grub-proofing, whereby many turf-infesting insects other than the lawn beetle can be eradicated, consists of applying 1 oz. lead arsenate per sq. yd in water or mixed with damp sand in September for 2 successive years, with an interval of 5 years before further treatment.

Roses.

(*See also* 1521.)

1786. Anon.
Cultures florales. Rosier: recherche de porte greffes. (Floriculture. Rose: rootstock studies.)
Rapp. Conseil Exp. Rech. agron. Algér. 1952, 1953, pp. 149-50.

The chief Algerian rootstock, *R. indica major*, has the disadvantage of slow growth in the cold season. Of 4 varieties tested as a substitute *Rosa sempervirens* gave the best results, namely 90% strike of cuttings and 75% take in grafting (compared with 82% and 70% in *R. indica major*), and grafted plants showed good vigour and root development. Its compatibility with cut-flower varieties is being tested.

1787. Kukolev, P. A.
Biological characteristics of roses raised from root cuttings. [Russian.]
Agrobiologija, 1952, No. 4, pp. 133-4, illus.

In the Crimea during the very severe winter of 1949-50, only 12·3% of roses (*Rosa gallica*) raised from root cuttings were injured, mostly only slightly, whereas 34·5% of plants of the same species raised from stem cuttings were severely damaged. Plants from root cuttings also produced 22% more bloom. The frost resistance of roses produced from root cuttings was similar to that of plants budded on seedlings of wild roses. The superiority of root cuttings over stem cuttings or layers is explained by the fact that the tissues of the former were relatively young and gave rise to stem and root systems both of which were new. Biologically plants from root cuttings are comparable to seedlings.

1788. Asen, S., and Hamner, C. L.
Effect of growth-regulating compounds on development of basal shoots of greenhouse roses.
Bot. Gaz., 1953, **115**: 86-9, bibl. 6, illus.

Several growth-regulating compounds (ethylene chlorohydrin, naphthaleneacetic acid, naphthoxyacetic acid, 2,3,5-triiodobenzoic acid, and a mixture of all four) were tested on greenhouse roses for their effect on the development of basal shoots, the "bottom breaks" desirable for the rejuvenation of old bushes and for the enhancement of flower production. 2,3,5-triiodobenzoic acid significantly increased the number of basal shoots per plant, as well as the number of plants developing such shoots, the figures being 1·47 and 90·7% compared with 0·56 and 43·8% in the untreated control.—Michigan State Coll., East Lansing.

1789. Massey, C. W.
The anthracnose disease of roses.
Amer. Rose Annu., 1952, **37**: 198-207, illus., from abstr. in *Rev. appl. Mycol.*, 1953, **32**: 628.

Anthracnose of roses (*Sphaceloma rosarum*) is very widespread, but it is severe only on climbing roses in late summer. Control is effected by removal of infected stems during pruning and by frequent treatments with bordeaux mixture, liquid lime-sulphur, sulphur-lead arsenate dust, or sulphur dust, especially during a wet summer.

1790. Siegelman, H. W.
Cut flower storage tests.
Calif. Agric., 1953, **7** (12): 11, illus.

Roses and gardenias harvested from commercial greenhouses showed similar courses of respiration and storage lives when stored at 41° F. and also at 59° F., but at 77° F. there were notable differences between the two species. The respiration rate of flowers held at 77° F. was twice as fast as that of flowers held at 59° F., and nearly 8 times as fast as that of flowers held at 41° F. As the total CO_2 produced by the flowers during their usable storage life was similar regardless of temperature, it is concluded that these flowers should be stored at the lowest temperature that will not cause freezing damage. [See also *H.A.*, 23: 1063.]

Other trees and shrubs.

(*See also* 1302, 1569, 1813b, g, j, l, n, w, 1875.)

1791. Oliver, R. W.
Hedges for Canadian gardens.
Publ. Canada Dep. Agric. **899**, 1953, pp. 22, illus.

Since 1899, 169 species and varieties of trees and shrubs have been tested as hedges at the Central Experimental Farm, Ottawa. The information in this publication is based on these test hedges and on hedge collections at some 20 other experimental stations. It covers the selection of hedges, planting, trimming, manuring, and diseases and pests, and provides lists of the species found most suitable in Canada for high and low formal trimmed hedges and informal hedges with notes on each of the better species. Finally information is tabulated on the behaviour, including winter hardiness, of a large number of species.

1792. Yashiroda, K., and others.
Dwarf potted trees as the Japanese grow them: a comprehensive handbook on kinds, training, culture.
Brooklyn bot. Gdn Rec., 1953, **9**: 141-228, illus., available as a separate, price $1.00, post paid.

The whole of this number of the *Brooklyn Botanic Garden Record* is devoted to a series of articles by Japanese experts on *bonsai*, which is the term used for growing artificially dwarfed trees or plants in pots. The technique used in this ancient art, which is known to date back at least to A.D. 1310, is described in detail with the aid of line drawings and many striking photographs.

1793. Connors, C. H.
Pruning shrubs.
Bull. N.J. agric. Exp. Stat. **771**, 1953, pp. 30, illus.

In general both spring- and summer-flowering shrubs should be pruned when dormant, but a few species are best pruned in the summer, for example forsythia, hydrangea and summer-flowering spiraea. After notes on tools and their uses detailed instructions are given for pruning boxwood, coloured twigged plants such as cornus, broad-leaved and coniferous evergreens, deciduous and evergreen hedges, lilacs, magnolias, roses and climbers.

1794. Hanger, F. E. W., and Ravenscroft, A.
Air layering experiments at Wisley.
J. roy. hort. Soc., 1954, **79**: 111-16, illus.
Experiments have been in progress at Wisley for 2 years on air layering [marcotting] various trees and shrubs with the aid of polyethylene wraps. The procedure adopted is described in detail. The best results were obtained in April using one-year-old wood. Among various growth substances applied as dusts to the marcot cut indolylbutyric acid was the most successful. With easier subjects such as *Abeliophyllum*, *Mahonia*, *Magnolia*, *Parrotia* and *Prunus* concentrations up to 8,000 p.p.m. generally produced 100% rooting within 10 to 12 weeks. Hybrid tea roses needed concentrations of 15,000 to 20,000 p.p.m. IBA. Most *Acers* rooted readily with 20,000 p.p.m. but *A. palmatum* and *A. palmatum atropurpureum* needed 30,000 p.p.m. Where too high concentrations of IBA were used, some species, notably magnolias, produced thong-like roots that were without root hairs.

1795. Dickey, R. D., Griffiths, A., Jr., and McFadden, S. E., Jr.
Native and introduced ornamental plants.
A.R. Fla agric. Exp. Stats 1951/52, pp. 92-3.
Three investigations are mentioned: 1. In preliminary trials cuttings of all plants tested [unspecified] rooted under continuous mist as well as, or better than, under conventional treatment. Among several rooting media tested those containing peat moss and sawdust, in combination with each other or with vermiculite, were the most effective. Baffle-spray nozzles proved more satisfactory than direct atomization types for continuous mist propagation. 2. Soaking seeds of the pigmy date palm (*Phoenix roebeleni*) in concentrated sulphuric acid for periods up to 16 mins. significantly depressed germination. 3. Storing tulip bulbs for 30 days at room temperature and then for 60 days at 40° F. resulted in good flowering. Reversing the order of treatment was much less effective. Storage at 60° F. for 90 and 120 days did not meet the cold requirements of the 3 varieties tested. Storage at 36° F. for 90 days significantly depressed flowering as compared with 90 days at either 40° or 50° F.

1796. Wells, J. S.
Further notes on constant mist.
Amer. Nurserym., 1953, **98** (11): 12-13, 62-7, illus.
Results are given of large-scale tests, conducted in 1953, on outdoor rooting of cuttings under constant mist. [For earlier work see *H.A.*, 23: 4473.] With *Thuja orientalis aurea nana*, early cuttings of a large size taken at the beginning of June rooted best. Although hormone applications are not generally successful with this plant, treatment with a new compound, Geigy 416, gave excellent results. Soft, actively growing tips of various magnolias taken in early June rooted in 3–8 weeks. Results with azaleas, as before, were completely successful. In limited trials plants previously not tested under these conditions, such as *Viburnum*, *Lonicera*, *Cornus* and *Prunus*, all rooted well. For most of the cuttings coarse grade, washed plaster sand was used as rooting medium, but azaleas in a 50-50 mixture of this sand and acid Dutch peat (pH 4·8) produced much stronger root systems.

1797. McNitt, V. J.
Plastic wigwam aids in outdoor propagation.
Amer. Nurserym., 1953, **98** (12): 10, 28-30, illus.
It is stated that the propagation of woody ornamentals hitherto confined to the greenhouse can now be accomplished in the open with the aid of plastic covers. The rootstocks lined out in regular nursery rows are grafted to the desired variety by any method preferred and the grafts are covered with individual plastic tents supported by small stakes. The covers can also be used to protect cuttings, young transplants and late flower buds and to preserve scion wood.

1798. Narasinga Rao, U.
A note on the use of polythene film in the air-layering of fruit and other horticultural crops.
S. Indian Hort., 1953, **1**: 105-8, bibl. 2.
Polythene film was tested for 9 months with 18 fruits and ornamentals at various Fruit Stations. At day temperatures of 80–105° F. the material proved insufficiently durable. Only with croton, in which profuse rooting occurred in 40–60 days, was the result (100% success) better than with ordinary wrappers.

1799. Białobok, S., and Jankiewicz, L.
Wpływ substancji wrzostowych na ukorzenianie się sadzonek zielnych drzew i krzewów. (**The effect of growth substances on rooting of softwood cuttings of trees and shrubs.** [English and Russian summaries ¾ p. each.]
Roczn. Nauk rol. Ser. A, 1953, **66** (3): 117-36, bibl. 12.
Indoleacetic-, indolebutyric-, naphthaleneacetic-, sodium salt of naphthaleneacetic- and 2,4-dichlorophenoxyacetic-acids were applied to soft wood cuttings of nearly 100 species and varieties. About one half of the treated plants rooted more readily than the controls, but plants which rooted 70–100% without growth substances showed no response to treatment. The best methods of applying growth substances appeared to be as powders and concentrated solutions. Diluted solutions gave good results but were inconvenient to use. 2,4-D applied in 3 concentrations did not promote rooting and was often phytotoxic.

1800. Griffiths, A., Jr., and Gammon, N., Jr.
Culture and classification of camellia and related genera.
Miller, H. N.
Control of soil organisms causing damping-off and root rots of nursery plants.
A.R. Fla agric. Exp. Stats 1951/52, pp. 96-7 and p. 117.
By comparison with standard rooting procedure losses of camellia cuttings were halved under the system of continuous mist combined with high light intensity. Of 4 media tested sand was poor under both propagating systems, a mixture of peat moss and pine sawdust in equal volumes was poor under no-mist but satisfactory under mist, while sand/peat-moss and peat-moss/vermiculite mixtures were satisfactory under both systems. The use of hormones had no effect under either system. Mist propagation also reduced rhizoc-

tonia rot of cuttings; 85% remained healthy compared with 46% without mist. The continuous-mist system also proved satisfactory for storing scion material for 6–8 weeks before grafting and for hardening-off imported plants but not for maintaining newly grafted plants.

1801. Curtis, J. D.
Effects of pre-germination treatment on the viability of *Ceanothus* seed.
Ecology, 1952, **33**: 577-8, from abstr. in *Brit. Abstr. A.III*, 1953, column 721.

Seeds of *Ceanothus velutinus* soaked for 90 minutes, as water heated to 82° cooled, showed increased germination. Unsoaked seeds germinated more readily after "burning" (burying 1 in. deep in moist soil on which an 18-in. diameter brush fire burnt for 45 mins.).

1802. Samuels, G., and Cibes, H. R.
Iron chlorosis on *Dracaena sanderiana*.
J. Agric. Univ. Puerto Rico, 1953, **37**: 265-72, bibl. 3, illus.

A study of a chlorosis on *Dracaena sanderiana* in Puerto Rico disclosed the following facts: (1) The chlorosis, which consists of a yellowing of the younger rather than the older leaves, is caused by a lack of available iron; (2) it was found in soils with a pH range from 4·2 to 7·5 and with textures from loamy sands to heavy clays, and was more prevalent on poorly drained soils; (3) the use of ferrous sulphate sprays gave unsatisfactory results because of a spotting or uneven greening of the leaf and an unsightly residue which it was difficult to remove by washing; (4) the use of the ferric salt of ethylenediamine tetraacetic acid (12% metallic iron) as a spray (1 lb. per 100 gal.) gave satisfactory control without leaving any spray residues or causing spotting; (5) Fe-EDTA gave satisfactory results when applied to the roots in solution, but took longer to work than did the Fe-EDTA sprays. General recommendations are made. [From authors' summary.]

1803. Cantelo, W. W.
Life history and control of euonymus scale in Massachusetts.
Bull. Mass. agric. Exp. Stat. **471**, 1953, pp. 31, bibl. 41, illus.

The euonymus scale, *Unaspis euonymi*, is yearly increasing its destruction of ornamental shrubs, especially *Euonymus* spp. It is found throughout the United States, although it is more destructive in the north-east. Notes are given on host range, morphology, life history, seasonal history (2 and sometimes a partial third generation per annum), and on experiments and observations on chemical, biological and cultural control. Control recommendations are a late dormant spray of 1–1·5% DNOC and 4 summer sprays, at, and 10–14 days after, the hatching of the first and second generations, consisting of either 1 pt 40% nicotine sulphate in 1 gal. summer oil emulsion, 2 qts 25% DDT emulsifiable concentrate to 100 gal. water, or a 3% solution of 50% DDT.

1804. Rial Alberti, F.
Experiencias sobre el cultivo de *Hibiscus hamabo*. **(Experiments in the cultivation of *Hibiscus hamabo*.)**
Idia, 1953, No. 63, p. 3.

Notes are given on successful propagation by grafting of the ornamental *Hibiscus hamabo* on *Hibiscus mutabilis*.

1805. Cortvriendt, S. F., and de Groote, R.
Essai de fumure sur *Hydrangea hortensia* von Siebold var. Altona. **(Fertilizer trial with *Hydrangea hortensia* var. Altona.)** [English summary 5 lines.]
Rev. Agric. Brux., 1954, **7**: 32-40, illus.

The effect of 12 different chemical fertilizers, alone and in various combinations, on hydrangea undergoing forcing, was studied in 1953. The fertilizers were applied in finely ground form to the surface of the soil in the pots and watered in. Results and conclusions were (1) a 12: 20: 26 fertilizer applied at the rate of 3 g. per pot fortnightly from the third week in the glasshouse gave the best results; (2) large applications (6–9 g. at a time) of compound fertilizers delayed growth; (3) potassium nitrate plus monopotassic phosphate plus iron citrate gave better leaf colour than the 12: 20: 26 fertilizer; (4) small additions of iron always improved leaf colour; (5) salts containing chlorine should not be applied; (6) quick-acting nitrogenous fertilizers should be applied at the beginning of forcing (urea, being slow-acting, gives no results); and (7) the optimum pH for Altona is 5·20–5·35.

1806. Institutt for Blomstedyrking og Veksthusforsøk.
Hvordan oppnår en best rosa og raue blomsterfarger hos stuehortensia (*Hydrangea opuloides* Koch)? **(How to obtain good pink and red flower colour in hydrangea house plants.)**
Gartneryrket, 1954, **44**: 35-8, bibl. 7, being *Meld. Inst. Blomstedyrk. Veksthusfors. norg. LandbrHøgsk.* **56.**

In small-scale trials it was found that an extra supply of P during forcing enhances pink colour development in hydrangea. Care must be exercised, however, as an overdose may cause chlorosis.

1807. van Katwijk, W.
Mozaiek bij gouden regen. **(Mosaic of laburnum.)** [English summary 11 lines.]
Tijdschr. PlZiekt., 1953, **59**: 237-9, bibl. 7, illus.

The symptoms of laburnum mosaic are described. Observations made in the Netherlands since 1948 show that the disease is prevalent in *Laburnum anagyroides* and *L. vossii*. Preliminary experiments have confirmed its virus nature. It was found that *L. alpinum*, previously considered immune, can also be infected. The ornamental shrub *Lespedeza formosa* shows mosaic symptoms which are exactly like those of laburnum mosaic. As control measures, the use of propagating material from healthy plants and the control of aphids in the nursery are recommended, although aphid transmission has not yet been proved.

1808. Hattingen, R.
Ein Feind der Mahonie. **(Mahonia rust.)**
Gartenwelt, 1954, **54**: 44-5, illus.

Mahonia plants infected with *Uropyxis sanguinea* should be cut down to ground level in the autumn and the prunings burnt. The soil around these shrubs should be dug and new growth should be protected with 1% bordeaux.

1809. Zaar, E. I.
Grafting of *Quercus robur*, using the plumule of a germinating seed as scion. [Russian.]
Bot. Žurnal, 1953, **38**: 440-1, illus.
The growing point of a 5–6 cm. high oak seedling was removed, the stem immediately above the cotyledons was split and a plumule of the same species was inserted into it. To hasten callusing, the cut surface of the rootstock was treated with a 0·1% solution of heteroauxin. The union was bound with a silk thread. The grafts were placed in a damp atmosphere at 23–25° C. and given artificial illumination. Out of 7 specimens 3 grew and overwintered.

1810. Manaresi, A., Colombo, C., and Mengoli, E.
Ricerche sulla germinabilitá dei semi "duri" della "*Robinia pseudoacacia*" L. **(Germination experiments with hard seeds of *Robinia pseudoacacia*.)**
Mem. Accad. Sci. Ist. Bologna, 1951, pp. 32, bibl. 53.
Robinia pseudoacacia seeds are mostly "hard". They are either black or chestnut-brown dotted with black, each tree having seeds of a single type. Colour and hardness are correlated, black seeds being somewhat more resistant to sulphuric acid and to hot water. The 2 types are different in weight and dimensions. Notes are given on tests in which seeds were treated with concentrated sulphuric acid and other chemicals and with boiling and hot water.

1811. Ewart, M. H., Siminovitch, D., and Briggs, D. R.
Studies on the chemistry of the living bark of the black locust tree in relation to frost hardiness. VI. Amylase and phosphorylase systems of the bark tissues.
Plant Physiol., 1953, **28**: 629-44, bibl. 28.
These characterization studies on the amylase and phosphorylase systems of the living bark of the black locust tree have yielded no definite clues as to whether or how these enzymes may be involved in the temperature sensitive reversible deposition (or mobilization) of starch which occurs in these tissues and which apparently plays a minor role in determining the power of the locust bark to withstand injury by freezing. [From authors' summary.]—Div. agric. Biochem., Univ. Minnesota, St. Paul 1.

1812. Wells, J. S.
Pointers on propagation; propagating Koster spruce.
Amer. Nurserym., 1953, **98** (9): 13, 48-53, illus.
Koster spruce, a selection of Colorado spruce, *Picea pungens*, is most successfully propagated by grafting on 2-year-old Norway spruce (*P. abies*) seedlings in March. The scions, preferably strong, central shoots about 6 in. long, are prepared by scraping the needles from the base of the stem for a distance of 2 in. The method of grafting used is the side or veneer graft, making 2 points of contact between stock and scion with no cut surface exposed to the air. Immediately after, the union is coated with paraffin wax. The grafts are then set out on open benches in a cool greenhouse where temperatures are maintained at a moderate level with a maximum of 65° F., and the plants are watered regularly and fairly heavily. The after care, planting out and training of the plants are outlined. Notes are also given on the propagation of Koster spruce by cuttings.

Noted.

1813.

a Allen, H. T.
Lawn grasses and maintenance of lawns under dry land conditions.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 84-6, bibl. 2.

b Barret, W. H. G.
Las coníferas cultivadas en la región del Parque Nacional Nahuel Huapi. **(Conifers cultivated in the region of the Nahuel Huapi National Park [Argentina].)**
Idia, 1953, No. 63, pp. 14-15.
Mostly ornamental pines and spruces.

c Beaumont, A.
Diseases of muscari.
Gdnrs' Chron., 1953, **134**: 229.
Bacterial soft rot, *Bacterium carotovorum.*

d Bishop, C. J., and McGowan, L. J.
The role of the vegetative nucleus in pollen tube growth and in the division of the generative nucleus in *Tradescantia paludosa*.
Amer. J. Bot., 1953, **40**: 658-9, bibl. 6, illus.

e Duperrex, A.
Malformations des fleurs cultivées. **(Malformations of cultivated flowers.)**
Rev. hort. suisse, 1954, **57**: 18-21, illus.
Carnation, dahlia, cosmos, and chrysanthemum.

f Eschrich, W.
Beiträge zur Kenntnis der Wundsiebröhrenentwicklung bei *Impatiens holsti*. **(The development of wound sieve tubes in *Impatiens holsti*.)**
Planta, 1953, **43**: 37-74, bibl. 16.

g Herklots, G. A. C.
Some flowering trees, shrubs and climbers, native and exotic [in Hong Kong].
Food and Flowers, 1953, No. 3, pp. 1-29, illus.
Twelve species described and illustrated.

h Holtzmann, O. V., and Thomas, W. D., Jr.
Studies on the wilt of carnations caused by *Pseudomonas caryophylli*.
From abstr. in *Phytopathology*, 1953, **43**: 587.
Histological and biochemical investigations.

i Ivanov, S. M.
Causes of non-parasitic root rot in geranium. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (5): 33-7, bibl. 2.
Due mainly to insufficient soil aeration.

j KRÜSSMANN, G.
Beiträge zur Kenntnis der Gartenformen von Buxus. (**Garden forms of box.**)
Dtsch. Baumsch., 1953, **5**: 340-1, bibl. 9.
19 subspecies of *Buxus sempervirens* described.

k KRÜSSMANN, G.
Entblätterung mit chemischen Mitteln. (**Defoliation by chemical means.**)
Dtsch. Baumsch., 1954, **6**: 16-18.
American work reviewed.

l KRÜSSMANN, G.
Die *Hamamelis*- Arten und- Formen unserer Gärten. (**Garden species and forms of *Hamamelis*.**)
Dtsch. Baumsch., 1954, **6**: 44-7, illus.

m MINISTRY OF AGRICULTURE, LONDON.
Violet root rot.
Adv. Leafl. Minist. Agric. Lond. **346**, reprinted 1953, pp. 4, illus.

n NAEGELE, J. A.
Kill soft brown scale [*Coccus hesperidum*].
Bull. N.Y. St. Flower Grs, 1953, No. 100, p. 3.
Control on shrubs with Dithiono (Sulfotepp) aerosols or with malathion.

o OLIVER, R. W.
Ornamental plant breeding in the Division of Horticulture, Central Experimental Farm, Ottawa, 1953.
Rep. Proc. 9th annu. Mtg West. Canad. Soc. Hort., 1953, pp. 91-3.

p PADMANABHA RAJU, B.
Some important flowers of South India and their cultivation.
S. Indian Hort., 1953, **1**: 88-98, bibl. 5.
Jasmine, chrysanthemum, lily and *Crossandra*.

q PELLUCHI, L.
Le macchie clorotiche ad anello su *Saintpaulia ionantha* in Italia. (**A chlorotic ringspot on *Saintpaulia ionantha* in Italy.**) [English summary 5 lines.]
Ann. Sper. agrar., 1953, **7**: 1705-8, bibl. 4, illus.
Reported for the first time in Italy.

r RAO, V. S., AND SIRDESHMUKH, K. B.
The floral anatomy of *Saraca indica*: a re-investigation.
New Phytol., 1954, **53**: 140-4, bibl. 6, illus.

s SCHWABE, W. W.
Photoperiodism in the chrysanthemum and its relation to vernalization.
Proc. Linn. Soc. Lond. 1951/52, 1953, **164**: 135-6, bibl. 3.
See *H.A.*, 21: 1883; 22: 781; and 23: 998 and 2079.

t SNOAD, B.
Abortive meiosis in plasmodial pollen mother cells of *Helianthemum*.
Ann. Bot. Lond., 1954, **18**: 1-6, bibl. 8, illus.
Leading to non-viable pollen in 2 garden varieties.

u STOUTEMYER, V. T.
Bermuda-bentgrass mixture.
Calif. Agric., 1953, **7** (11): 13.
Promising for wear-resistant lawns, see also abstract 1781.

v SWANSON, C. P., RUPERT, C. S., AND YOST, H. T., Jr.
Infrared absorption and temperature studies on the buds and chromosomes of *Tradescantia paludosa*.
Amer. J. Bot., 1953, **40**: 557-65, bibl. 13.

w VAUGHAN, J. G.
An investigation into the stem apex of *Syringa vulgaris* L. with special reference to the formation of the leaf and leaf procambium.
J. Linn. Soc. Lond., 1952, **53**: 511-15, bibl. 19, illus.
An anatomical study.

SUB-TROPICAL FRUIT AND PLANTATION CROPS.

General.

(*See also* 1146, 1153, 1296, 1795, 1912k, 2097.)

1814. KISLJAKOV, V. D.
In the subtropics of western Georgia. [Russian.]
Priroda, 1953, **42** (8): 82-9, illus.
A brief, well illustrated description of the flora of the region [east of the Black Sea] including notes on the economic plants: citrus, tobacco, eucalyptus, camphor tree, tung, persimmon, feijoa, cinchona, tea, fig, pomegranate, olive and sugar cane.

1815. ANON.
Cooperative attack on Argentine ant.
Rural Res. C.S.I.R.O., 1953, No. 3, pp. 18-19, bibl. 3.
Iridomyrmex humilis, now established in a few localities in Australia, might become a serious horticultural pest of most high-rainfall coastal regions not subject to severe winter frosts. It affords indirect protection to aphids, scales and mealybugs by destroying their natural predators. Spraying 60 gal. 2% chlordane emulsion per acre eradicates the ant from the treated area and re-invasion can be prevented by barrier spraying at 3- to 6-month intervals. Spraying during early summer in fine hot weather gives the best results. [An account of successful eradication by 2% chlordane in Western Australia in 1952/53 is given in *J. Agric. W. Aust.*, 1953, **2**: 631-7, bibl. 4.]

Avocadoes.

(*See also* 1159, 2098.)

1816. WALLACE, J. M., AND DRAKE, R. J.
Seed transmission of the avocado sun-blotch virus.
Citrus Leaves, 1953, **33** (12): 18-20, bibl. 10.

From tests for virus in rootstock parent trees, observations on unbudded seedlings and the results of budding experiments it is concluded that the sun-blotch virus can be readily transmitted through seeds and also that the absence of symptoms is not proof that an avocado tree is not a carrier of the disease. [See also *H.A.*, 24: 748.]

1817. Halma, F. F., and Zentmyer, G. A.
Relative susceptibility of avocado varieties to dothiorella rot.
Calif. Citrogr., 1954, **39**: 134-5.
Relative susceptibility of Guatemalan and Mexican varieties to dothiorella canker.
Citrus Leaves, 1954, **34** (2): 20, illus.
Recent inoculation trials have shown that the fungus *Dothiorella gregaria* (=*Botryosphaeria ribis*) can cause trunk cankers on avocadoes of both Guatemalan and Mexican types, but it is too early yet to warrant conclusions as to relative susceptibility. Field records suggest, however, that Guatemalan avocadoes are more susceptible than Mexican whether used as rootstocks or scions.

1818. de Figueiredo, E. R., Jr.
Sôbre uma praga do abacateiro. (**An avocado pest.**)
Biológico, 1953, **19**: 74-7, bibl. 4, illus.
In Santos the caterpillars of *Euglyphis fibra*, not previously recorded in Brazil, severely attack avocado plants in the nursery from September to January, defoliating them completely (except for a few of the oldest leaves) in a few days. Effective control is obtained with 0·4% lead arsenate, or 5% diethylparanitrophenyl thiophosphate (Rhodiatox) at 200 c.c. per 100 l.

1819. Malan, E. F.
The packing and export of Fuerte avocadoes.
Fmg S. Afr., 1953, **28**: 405, 432, bibl. 1.
Wrapping Fuerte avocadoes in polythene, preferably in the form of bags, has shown promise of improving keeping quality in fruits shipped from South Africa to the U.K. Cellophane, though not so effective as polythene, gave much better results than ordinary tissue wraps or no wrapping. Where delays of several days occur between picking and placing in cold storage on board ship, pre-cooling the trays at 40° F. for 48 hrs before railing to the port is necessary. Storage at 40° F. is apt to cause injury to unwrapped or tissue-wrapped fruit; no such injury has been encountered with polythene-wrapped fruit. Seven packs with counts ranging from 8 to 14 are recommended for use in standard 18×12 in. trays.

Citrus—varieties, rootstocks and propagation.

(*See also* 1912c, j.)

1820. Maĭsuradze, N. I.
Some results in orange breeding. [Russian.]
Agrobiologija, 1952, No. 1, pp. 69-78, illus.
The most promising result reported in this paper is the production of some nucellar seedlings which are as hardy as, and in certain cases hardier than, the Unshiu mandarin and produce good quality fruit.

1821. Culaja, V. I.
Characteristics of fruits of lemon cultivated in trenches. [Russian.]
Agrobiologija, 1952, No. 5, pp. 120-3.
The size, weight and composition of 11 lemon varieties grown in trenches on the Black Sea coast of the Caucasus are tabulated. The citric acid and vitamin C content of the trench-grown lemons was similar to that of the same varieties grown in the open. Under both systems of cultivation the Meyer lemon had the lowest citric and ascorbic acid content, but because of its valuable physical characteristics it is still one of the most suitable varieties for trench cultivation.

1822. Monselise, S. P.
Viability tests with citrus seeds.
Palestine J. Bot. (*R*), 1953, **8**: 152-7, bibl. 6.
The staining of peeled seed by selenite-indigo carmine solution (which stains live tissue red and dead tissue blue) and germination tests with peeled seed were both found to be of practical value, giving results several days or weeks before ordinary germination tests. They can only be used to show degree of viability, however, since they do not take into consideration the potential obstacle of the seed coat.

1823. Patt, Y.
Experiments on germination of immature citrus seeds.
Palestine J. Bot. (*R*), 1953, **8**: 219-20.
An account is given of tests which suggest that germinating power reaches a satisfactory level in September in the early ripening varieties of the lemon group (such as sweet lime, citron and rough lemon), and in October in the later ripening sour and sweet orange varieties. Sweet lime showed wide fluctuations in germinating power from year to year.

1824. Domato, J., and Aramayo, H. S.
Conducción de almácigos de portainjertos cítricos. (**Management of citrus rootstock nurseries.**)
Idia, 1953, No. 71, pp. 21-6, bibl. 2.
Further experiments confirmed previous conclusions [*H.A.*, 23: 3416] to the effect that early sowings are not a practical means of hastening rootstock production in Tucumán but led to improved techniques in shading with local materials such as cane and prunings. Three techniques were compared: (1) no shading until germination begins, then shading at 1·3 m. above ground, (2) shading laid on the bed till germination begins, then at 1·3 m., and (3) shading at 1·3 m. With Rangpur mandarin the number of days to complete germination, germination percentage, and amount of water used in litres per sq. m. per diem from sowing date to complete germination (average) with the 3 techniques were (1) 47, 63 and 4·5, (2) 52, 67 and 2·3, and (3) 62, 37·5 and 3·65.

1825. Jungwirth, E.
Identification of citrus stocks by colorimetric methods.
Palestine J. Bot. (*R*), 1953, **8**: 133-45, bibl. 10.
An account is given of a study in which several citrus species and varieties grown as stocks, scions and unbudded seedlings were investigated by colorimetric methods, using almén, ammonium molybdate, ferric chloride and titanous chloride as reagents.

1826. Selle, R. M.
Identifying sour orange rootstock by paper chromatography.
Citrus Leaves, 1954, **34** (1): 6-7, 34, bibl. 6, illus.

Paper chromatography can be used to distinguish sour orange rootstocks from other citrus species. Extracts from stem bark tissue give rise on chromatograms to a characteristic spot with an Rf value between 0·40 and 0·50 which is fluorescent in long-wave ultra-violet light. These "flame" spots may vary somewhat in intensity with different scion varieties, and when extracts from sour orange root tissue are used they are usually too feeble to be satisfactory. The only citrus species which has shown a similar spot is the non-commercial Messina lemon and this can be distinguished from sour orange by a different chromatographic technique.

1827. Anon.
The effect of rootstock on bitterness in canned orange juice.
Rural Res. C.S.I.R.O., 1953, No. 5, pp. 5-6, bibl. 2, illus.

The quality of processed orange products depends to a large extent on the nature of the rootstock. Bitterness is negligible in canned juice of both Washington Navels and Valencias on trifoliata stock. The bitterness rates of Navel on 9 different rootstocks were (1) no bitterness when ripe on trifoliata, tangelo, Cleopatra mandarin, (2) intermediate bitterness on Parramatta, sweet orange, East Indian lime, sweet lime, (3) bitter at full maturity on rough lemon and Kusae lime. The rates for Valencia were (1) free from bitterness on trifoliata, (2) intermediate on sweet orange and (3) bitter on rough lemon. 90% of Australian citrus is worked on rough lemon.

1828. Banfi, A., and Beñatena, H. N.
Influencias del portainjerto en algunas determinaciones físicoquímicas de importancia en citros. **(The influence of the rootstock on important biochemical factors in citrus fruit. Part II. Valencia Late orange.)**
Idia, 1953, No. 71, pp. 27-30, bibl. 8.

Studies were made of the fruit (colour, yield and weight per fruit) and juice (weight, colour, and chemical composition) of Valencia Late on sweet orange, trifoliate orange, rough lemon, Rangpur lime, common mandarin, sour orange, grapefruit, Persian lime and lime (*Citrus aurantifolia*). The four best rootstocks for fruit quality were trifoliate, sweet orange, Rangpur lime and rough lemon. [See also *H.A.*, 23: 3413.]

1829. Klimenko, K. T., and Klimenko, V. N.
The effect of rootstocks on the productivity and quality of oranges. [Russian.]
Agrobiologija, 1952, No. 2, pp. 128-32, illus.

In the Adžar Autonomous Republic a comparison was made, over 4 years, between Navel and Hamlin oranges grown on trifoliate and on sour orange rootstocks. Both varieties grew more vigorously and produced slightly higher average yields of larger fruits on sour orange. They started bearing, however, a year later and their fruits ripened 5–10 days later than on trifoliate. Oranges from trees on sour orange stored better, but those from trees on trifoliate were of superior flavour. Vitamin C and acid contents of both varieties were higher on trifoliate; the sugar content of Navel oranges was higher on sour orange than that of Hamlin oranges on trifoliate.

1830. Prohorov, N. K.
Improving the hardiness of mandarins. [Russian.]
Agrobiologija, 1952, No. 3, pp. 44-9, bibl. 1, illus.

It is recommended that mandarins should be top-worked on 3- to 4-year-old hardy rootstocks such as citrus hybrids 78 and 100, citrange and the mandarin variety Šiva-Mikan at 1 or 1·5 m.

1831. Taboada, V. L.
Afrancamientos en plantas injertadas sobre naranjo agrio en la provincia de Tucumán. **Scion-rooting experiments with plants grafted on sour orange in Tucumán province.)**
Idia, 1953, No. 71, pp. 11-12, illus.

Experiments in scion-rooting as an emergency measure against tristeza (if it should appear) are being carried out at Tucumán Experimental Station. Four orange varieties grafted on sour orange were partially ring-barked at the union, and the cuts then disinfected and covered with earth. Rooting occurred in 1 out of 3 Lue Gim Gong, 3 out of 3 Valencia Late, 3 out of 3 Mediterranean Sweet and 3 out of 6 Ruby Blood, the most abundant rooting being in Valencia and Lue Gim Gong. In the event of attack by tristeza these roots could nourish the scion while those of the stock acted merely as a support. Scion-rooting does not solve the problem even in those varieties which root abundantly, as the duration of life of the trees under such conditions is unknown, but they would survive until they could be replaced by others on the resistant stocks now being multiplied.

Citrus—cultivation and irrigation.

(*See also* 1912i.)

1832. Domato, J., and Heredia Luna, S.
Valor de la leguminosa como cultivo intercalado en los citrus. **(Legumes as inter-crops in citrus.)**
Idia, 1953, No. 71, pp. 2-8, illus.

Nine different leguminous crops were investigated as inter-crops in a 23-year-old citrus orchard which had received no special soil treatment for 9 years and in which growth and yield were poor; they resulted in improvement in soil and growth at low cost. *Effect on nitrogen and organic matter content of soil.* The N content of the soil was lower in all the cropped plots than in the control but in 5 out of the 9 the organic matter content was somewhat higher than in the control. Soil N content was not correlated with incidence of root nodules in the leguminous crop. *Effects on soil structure* cannot yet be fully assessed but appear to be two, namely a greater compactness in the case of crops with tap roots and a better crumb structure in that of fibrous-rooted crops. *Soil humidity.* The 3 crops in which soil humidity was highest in the dry season were those with fibrous root systems, namely *Mucuna*, Lyon french bean and late soya. *Mineral elements.* All cropped plots were rich in Ca and P, normally to well provided with K and poorly to normally supplied with Mg; the control was deficient in Ca and rich in K.

Conclusions were (1) leguminous crops are of moderate value as inter-crops in citrus on average to fertile soils and of greater value on poor soils or those of poor structure; (2) in average to rich soils there is no nitrogen accumulation under leguminous crops perhaps owing to their use of soil N in fixation; (3) legumes with long growing cycles should be used so that the nutrient substances they provide are available when most required, namely at growth flush, flowering and fruiting; (4) green manure crops should therefore be sown in late spring or early summer; (5) the most suitable crops in the conditions of the experiment are late soya, Lyon french bean and *Desmodium tortuosum*.—Estac. exp. agric. Tucumán.

1833. Sauer, M. R.
Fruit sizes. Need for adequate soil moisture in Feb.-May shown by Valencia measurements at Merbein.
Citrus News, 1953, **28**: 138-9, 141.

Weekly circumference measurements of Valencia oranges were made at Merbein in February-October 1950 and 1952 to investigate growth under irrigation. Irrigation took place in January, April, July and September in 1950 and at the end of February, end of March, and in May, August, September and November in 1952; the March 1950 irrigation was omitted owing to heavy rain. The data suggest that growth was not optimal in midwinter and early spring but, since this is more than 7 months after fruit set, it should not affect final size; responses to July and August irrigations indicate, however, that an additional winter irrigation should be considered annually. Growth in February-May was satisfactory in 1952 but not in 1950; adequate soil moisture at this season is essential for maximum fruit size at harvesting.

1834. West, E. S., and Perkman, O.
Effect of soil moisture on transpiration.
Aust. J. agric. Res., 1953, **4**: 326-33, bibl. 9.

The march of soil moisture in an experimental citrus grove was determined by successive soil sampling. Following an irrigation the soil moisture content progressively falls owing to withdrawal of water by the plants. It was found that the soil moisture content could be expressed as an exponential function of the accumulated evaporation from a free water surface since the last irrigation. The rate of water withdrawal is a function of the soil moisture content. [From authors' summary.]

1835. Cameron, A. E.
Re-greening of Valencias.
Citrus News, 1953, **28**: 170-1.

Evidence suggests that abundant soil moisture is a major factor conducive to re-greening in Valencia oranges and that a drying-out of the soil between summer irrigations is beneficial. Valencias on citronelle [rough lemon], a drought-resistant stock, re-green earlier in the season than those on sweet and sour orange, which require more water; the assumption is that under similar soil moisture conditions trees on orange stocks are less fully supplied with their moisture requirements. In all cases, the more vigorous the tree the earlier and the more intense the re-greening.

Citrus—tree composition and nutrition.

(*See also* 1208, 1912h.)

1836. Anon.
Fertilisation des agrumes. (**Citrus fertilization.**)
A.R. Conseil Exp. Rech. agron. Algér 1952, pp. 21-5.

Effect of high N in spring on flower drop. 775 g. calcium nitrate per tree did not depress fruit set and, though perhaps not economic, demonstrated the need for abundant N during flowering. If soil moisture is inadequate high applications may have a toxic effect through increasing the concentration of soil solutions. Irrigation should quickly follow heavy manuring. *Nitrogen leaf sprays.* Urea sprays applied thrice in May-June gave only slight yield increases, the best rate being 10 l. 1% urea, but caused leaf symptoms resembling those of phosphorus deficiency. *Soil injection.* In an experiment begun in 1946 the treatments are injected PK, P, N and K and surface application of PK. Up to 1949 the 5 plots gave similar yields; in 1951 and 1952 the PK injected plot gave nearly double the yield of the other plots. *Minor elements.* Trees sprayed in May with 0·5 kg. manganese sulphate plus 0·25 kg. lime in 100 l. water lost their manganese deficiency symptoms in 2–3 weeks. Trees treated in 1951 but not again in 1952 showed a mild recurrence of symptoms. Treatment should be repeated every 2 years.

1837. Harding, R. B.
Exchangeable cations in soils of California orange orchards in relation to yield and size of fruit and leaf composition.
Soil Sci., 1954, **77**: 119-27, bibl. 16.

No significant differences in the means of the cation contents of the leaves and soil were found between California orange groves with high yields and large fruit sizes and with low yields and small fruit sizes. Hence factors other than excess or deficiency of exchangeable soil cations account for production differences.

1838. Smith, P. F.
Heavy-metal accumulation by citrus roots.
Bot. Gaz., 1953, **114**: 426-36, bibl. 12.

Various short-term experiments on the accumulation of heavy-metal ions by citrus roots are described. Copper, zinc, iron, and manganese appear to be accumulated by roots from mildly acidic solutions through non-vital processes. Thus in matched samples of seedlings, half of which had the roots killed in boiling water, accumulation of these metals was essentially identical. For some unknown reason roots first allowed to adsorb Zn, Mn, or Fe were then found to adsorb more Cu than roots without this pre-treatment. There was little evidence that an adsorbed metallic ion repressed the adsorption of a second metal. Such repressive action was apparent, however, when two or more elements were in the same solution. Chelated Fe was particularly effective in reducing Cu adsorption. Copper, in turn, interfered somewhat with Mn adsorption. Copper accumulation by citrus roots appears to be directly related to the non-replaceable protein nitrogen of the root. Colour reactions showed that the bulk of the cortex is involved in the accumulation of

these elements. The innermost layer, the endodermis, appeared to have the highest concentration of both Cu and Zn. Apparently, the mechanism involved in the adsorption of these elements by plant roots is not entirely dissimilar to that of soil colloids where cations are held by polar linkages. [From author's summary.]—U.S. subtrop. Fruit Field Stat., Orlando, Fla. [See also *H.A.*, 24: 774.]

1839. Griffiths, J. T., and Enzor, J. K., Jr.
A preliminary report on the requirements of young Valencia trees for zinc, manganese and copper when fertilized at two different rates.
Citrus Ind., 1954, **35** (1): 9-12, bibl. 1.

Valencia orange trees on rough lemon stock planted on virgin soil in 1949 received 2 levels of NPK during subsequent years and 7 spray applications spread over 5 years of Cu, Mn and Zn, alone or in combination. Each of the metals was applied at rates of 0, 1 and 3 lb. of the sulphate per 100 gal. Although some Mn and Zn deficiency symptoms were apparent at an early stage, treatment with these metals had not up to the end of the fourth year increased trunk diameters or yields. No signs of Cu deficiency appeared until 1952 when some ammoniated fruits were seen. Cu sprays did not affect trunk diameters but increased fruit yield slightly. These results suggest that citrus trees need very little Cu, Mn and Zn during the first 4 years after planting.

1840. Stewart, I., and Leonard, C. D.
Citrus nutrition studies. Molybdenum deficiency.
A.R. Fla agric. Exp. Stats 1951/52, pp. 156-7, illus.

Yellow spot due to molybdenum deficiency occurs on nearly all kinds of citrus, but is more pronounced in trees on grapefruit stock than in trees on other rootstocks. In spray treatments the lowest amount of sodium molybdate to give a satisfactory response was 0·1 oz. in 10 gal. water. Mo has proved compatible with various fungicides and insecticides. Trunk injections of 1 g. sodium molybdate caused deficient trees to turn green, but soil applications were unsatisfactory. Translocation of Mo appears to be limited; when the lower halves of trees were sprayed, only the leaves that were covered by the spray turned green. Yellow spot leaves contained 0·03 to 0·08 p.p.m. Mo. [See also *H.A.*, 23: 2171.]

Citrus—growth phenomena.

1841. Monselise, S. P.
Growth analysis of citrus seedlings. II. A comparison between sweet lime, rough lemon and sour orange.
Palestine J. Bot. (*R*), 1953, **8**: 125-32, bibl. 9.

The investigations reported were undertaken to corroborate previous findings [*H.A.*, 22: 1784] on net assimilation rates and relative growth rates in citrus seedlings and to determine whether important differences exist between the principal rootstocks of Palestine. Nine-month-old seedlings were studied over a period of a fortnight. The net assimilation rates of sour orange were found to be significantly lower than those of rough lemon or sweet lime. Relative growth rate was also lower in sour orange, though not significantly so since the lower net assimilation rates were partly compensated for by a relatively larger proportion of leaf surfaces and weights. The average weights of 40 seedlings at the end of the observation period were: sweet lime—10·41 g., rough lemon—9·21 g., and sour orange—2·97 g. The results were obtained from a study of the aerial organs only but evidence suggests that they are applicable to the whole plant. The sweet lime data agree well with those of previous experiments if allowance is made for root production.

1842. Rokach, A.
Water transfer from fruits to leaves in the Shamouti orange tree and related topics.
Palestine J. Bot. (*R*), 1953, **8**: 146-51, bibl. 9.

The transfer of water from fruit to leaves, known to occur in fruit trees and vegetables under conditions of an inner water deficit, was shown to take place in the Shamouti variety. This could be demonstrated by records of fruit contraction and of changes of water content, osmotic values and, to a certain degree, of water saturation deficits. The suction was shown to transport water easily from a fruit in a defoliated main branch to a leafy lateral. The evidence suggests that this water is withdrawn from the peel but not from the pulp. No measurable transfer of water takes place before the fruit attains the size of a large olive, weighing 8–10 grams. Fresh weight transpiration of young fruit is about 40 times lower than that of leaves and stomatal density is many times lower. [Author's summary.]

1843. Klimenko, K. T., and Klimenko, V. N.
Pollination of citrus fruits with mixed pollen. [Russian.]
Agrobiologija, 1952, No. 3, pp. 39-43.

Data are presented showing that the pollination of some oranges, mandarins and pomeloes with mixed orange pollen is beneficial for fruit setting and seed development.

1844. Anjaneyulu Naidu, N.
Some floral abnormalities in *Citrus* and *Fortunella* sp.
S. Indian Hort., 1953, **1**: 113-14, bibl. 9, illus.

A note on the transformation of part or the whole of the androecium into petaloid structures observed in Sathgudi (*Citrus sinensis*), kumquat and lemon.

1845. Leroy, J. F.
La "navélisation" chez le bigaradier. Les malformations des fleurs et des fruits chez les agrumes. Aspects scientifiques de ces faits. **(Navel formation in the sour orange. Malformations of flowers and fruits in citrus. Scientific aspects of these phenomena.)**
Rev. int. Bot. appl., 1953, **33**: 414-22, bibl. 11, illus.

The abnormalities in question are those of the calyx, the androecium and disc, the gynoecium, the androecium and gynoecium simultaneously, and navelization. Their morphological significance is discussed.

Citrus—fruit composition.

(*See also* 2014.)

1846. DE RAGGIO, N. M., AND RAGGIO, M.
Pigmentos y actividad catalásica en frutos de mandarina durante la maduración en iluminación natural y oscuridad. (Pigment changes and catalase activity in mandarins during ripening in natural light conditions and in darkness.)
Phyton, 1953, **3** (1): 23-34, bibl. 22.

An account is given of changes occurring in chlorophyll *a* and *b*, in carotenoids and in catalase activity in the fruit, the rind and the leaf of the mandarin during the last 3 months of ripening on the tree. Weight per fruit rose from 33 to 80 g., and the acidity of the pulp decreased by two-thirds in both light and darkness while total carotenoids increased threefold in light and somewhat less in darkness. In the rind chlorophyll *a* increased somewhat in light and decreased considerably in darkness during "pre-degreening" (the first month), and catalase activity followed a similar course; chlorophyll *b* did not react to light during pre-degreening or degreening (the last 2 months); catalase activity increased in darkness and decreased greatly in light; carotenoids varied during the period in both light and darkness and in light were higher at the end. In the leaves the chlorophylls showed a general increase, the carotenoids remained constant and catalase activity varied irregularly.

1847. HARDING, P. L., AND SUNDAY, M. B.
Seasonal changes in Florida Temple oranges.
Tech. Bull. U.S. Dep. Agric. **1072,** 1953, pp. 61, bibl. 13, illus.

The investigation reported was undertaken to obtain data on which to base a practical standard for determining quality in the Temple orange (probably a Tangor hybrid, *Citrus reticulata* × *C. sinensis*). The results are presented with numerous tables and graphs of the periodic analysis of fruit and juice samples throughout the season (October-April) in the 4 years 1943/44 to 1946/47. Most of the fruit was grown on rough lemon and sour orange rootstocks and the rest on Cleopatra mandarin and sweet orange. Prime eating condition was reached in February. Fruit that met the minimum consumer acceptance standard contained at least 10% total solids by weight and had a solids/acid ratio of 7·87–7·71 to 1; a change in the present legal minimum standards for total solids and the solids/acid ratio is desirable. During the season (1) total weight of solids increased gradually, (2) total weight of acids decreased, (3) ascorbic acid concentration was consistently high, (4) active acidity and total ash (mainly mineral salts) increased slightly, and (5) juice volume and weight per fruit (which were closely associated) increased rapidly at first, were constant in prime fruit and then decreased slightly. Changes in rind and flesh colour and in rind thickness are recorded. According to taste ratings and chemical analyses the order of merit of the rootstocks was Cleopatra, sweet orange, sour orange and rough lemon.

Citrus—frost and wind protection.

1848. REDLICH, F.
Wind machine.
Citrus News, 1953, **28**: 119, 126, illus.

Notes are given on the Jetom antifrost rotating-jet wind machine which is suitable for use in radiation frosts. Powered by a 10 h.p. fan-motor unit, one machine has been found to protect an area of 4 acres of citrus.

1849. ALEKSANDROV, A. D.
Indoor cultivation of citrus. [Russian.]
Priroda, 1953, **42** (10): 106-11, illus.

The cultivation of citrus in dwelling rooms is an old Russian practice dating back to Peter I [1672–1725]. Lemons propagated by seed, cuttings, budding or grafting are the most suitable species for this purpose. Dwarfing varieties, usually of local origin, are recommended for a number of regions. Notes are given on pruning and training, fertilization, watering, illumination, transplanting and cropping. [See also *H.A.* 22: 2944.]

1850. VOBLIKOVA, T. V., AND KOSILKIN, I. A.
The importance of the physiological condition of lemon plants for their overwintering in trench cultivation. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1953, **92**: 1077-80.

Young lemon trees, variety Novogruzinskiĭ, grown in trenches and completely dormant at the time of covering, overwintered better and lost far fewer leaves than similar, but actively growing, plants covered at the same time. To induce winter dormancy summer shading with 3 layers of muslin was used successfully. Plants were overwintered in total darkness as successfully as when light of various intensities was provided. Trenches 1·2 m. deep appeared better than 1·8 m. trenches and in preliminary trials lemon on trifoliate rootstock shed fewer leaves than when grown on its own roots from cuttings.

1851. ROCK, R. C.
Cost comparison of four systems of citrus frost protection.
Citrus Leaves, 1953, **33** (11): 14-15, 26, 28.

Estimated installation and overhead costs are tabulated for 4 systems of frost protection for 10 acres of citrus: (1) slow-burning, smoke-producing heaters, (2) clean-burning heaters of the University return stack type, (3) a combination of wind machines and slow-burning heaters, and (4) a combination of wind machines and clean-burning heaters. In each case estimated operating and total costs are given for mild, medium and severe winters. Smoke-producing heaters, though cheaper to instal, are somewhat more expensive to operate than clean-burning heaters. In most situations the cost of protection is less with a wind machine plus a small number of heaters than with heaters alone, both labour and fuel charges being lower.

1852. LUCAS, J. W.
Tests on freezing in lemons.
Calif. Agric., 1953, **7** (11): 9-10, illus., and *Citrus Leaves*, 1953, **33** (12): 14, 32, illus., also summarized in *Calif. Citrogr.*, 1954, **39**: 99, under the title "Subcooling* and freezing in lemons".

Techniques used in preliminary investigations on subcooling (the extent to which plant parts cool below the freezing point without ice formation) and freezing in lemon fruits are outlined. Material studied included

* Also known as supercooling.

detached vesicles as well as whole detached fruits subjected to relative humidities of 8%, 55% and 90%, fruits immersed in alcohol, and fruits in which wettened surfaces were rubbed together. The results obtained so far indicate that once freezing begins it spreads rapidly throughout a subcooled tree part; that freezing initiation appears to occur near the surface of detached lemons, and that rubbing the wet fruit surfaces markedly reduces subcooling.

1853. Uzziel, M.
Windbreaks for citrus groves. [Hebrew.]
Hassadeh, 1953, 34: 94-6.

The need for planting windbreaks in Israel against prevailing south and south-west winds is stressed. Windbreaks should be planted a few years before the plantation, and treated as part of the plantation itself. *Cupressus pyramidalis* is generally recommended as a permanent windbreak, but in windswept sites and in the larger groves *Cupressus arizonica* or *C. horizontalis* may be used. Where casuarina and eucalyptus are used they should not be planted less than 12–15 m. from the first row of trees owing to severe root competition. Near the sea *Tamarix articulata* succeeds on light soils but needs hard pruning owing to its spreading habit. *Ricinus communis* and *Sesbania aegyptiaca* can be used as temporary windbreaks, both growing very rapidly, but the former is a host plant for many citrus pests.

H.C.R.

Citrus—diseases and pests.

(*See also* 1386, 1387, 1420, 1521, 1736, 1912a, d, e, f, l, m, n, o, p.)

1854. Knorr, L. C.
Crinkle-scurf—a leaf-crinkling, bark-scurfing disorder of late orange trees.
Citrus Mag., 1953, **16** (4): 12-14, 32.

Crinkle-scurf occurs in Florida mainly on Lue Gim Gong and Valencia oranges, but to a less extent on tangelo. It also occurs in Argentina and possibly other countries. Incidence is generally low but may reach about 50%. The symptoms are leaf crinkling and an obscure banding of the bark with fine lines of cork blisters at right angles to the main axis of trunk or branch. Yield and maturation do not appear to be affected but fruits are rough and abnormally oval. The cause is unknown but the disorder can be propagated by budding. The condition is not thought to be caused by virus.

1855. Bitters, W. P., Brusca, J. A., and Dukeshire, N. W.
Need for careful selection of lemon budwood shown by exocortis transmission tests.
Calif. Citrogr., 1954, **39**: 70-1, 84-5, bibl. 6, illus.
Effect of lemon budwood selection in transmission of exocortis.
Citrus Leaves, 1954, **34** (1): 8-9, 34, bibl. 6, illus.

Seedling rootstocks of trifoliate orange, Morton citrange and Troyer citrange were worked in 1951 with (*a*) Frost nucellar Eureka lemon, (*b*) Frost nucellar Eureka lemon and also bud-inoculated from a Eureka tree affected by exocortis, (*c*) an old-line Eureka lemon, and (*d*) the exocortis infected Eureka lemon, used for bud-inoculations. Seedling stocks of each type were also (*e*) bud-inoculated and (*f*) left unworked. By September 1953 a proportion of the trees in groups (*b*), (*c*) and (*d*) budded on trifoliate orange and Morton citrange had developed exocortis bark symptoms. These trees and also those in the same groups budded on Troyer citrange and the bud-inoculated seedlings of all 3 stocks showed various degrees of stunting, the stunting in some cases being pronounced although no symptoms of exocortis had yet appeared.

1856. Cohen, M., and Knorr, L. C.
Current status of tristeza in Florida.
Citrus Ind., 1954, **35** (2): 5-7, bibl. 3, illus.

This paper, presented a year after the presence of tristeza in Florida was announced for the first time, discusses the symptomatology of the disease, its dissemination, importance, and differences between Florida and South America as regards susceptibility of different citrus species and relatives.

1857. Chapot, H.
Le "quick decline" à Madagascar et les porte-greffes locaux. **(Quick decline in Madagascar and local rootstocks.)**
Fruits d'Outre Mer, 1953, **8**: 437-9, bibl. 1, illus.

Two Madagascar rootstocks, the local form of rough lemon known as Voangibe, and the combava, a form or hybrid of *Citrus hystrix* [see *H.A.*, 23: 1112], give tolerant combinations.

1858. McClean, A. P. D.
Citrus vein-enation virus.
S. Afr. J. Sci., 1954, **50**: 147-51, bibl. 2, illus.

This new citrus virus recently reported from California also occurs in South Africa. It does no apparent harm. Notes are given on symptoms, transmission by graft-inoculation and by *Aphis citricidus*, and detection.

1859. Reichert, I., Yoffe, J., and Bental, A.
Shamouti orange on various rootstocks and its relations to xyloporosis.
Palestine J. Bot. (*R*), 1953, **8**: 163-84, bibl. 8, illus.

A study of Shamouti orange on 32 rootstocks showed that xyloporosis is a decisive factor in compatibility, highly susceptible stocks not being suited to Shamouti. On loamy soil sour orange was resistant, moderately resistant or susceptible according to country of origin; Valencia was resistant; pummelo "Nanas", Egyptian sour lime, McCarthy grapefruit and various sweet oranges were moderately resistant; and sweet lime, rough lemon, sour lemon, Duncan grapefruit and trifoliate orange were useless as rootstocks. Only sweet lime and rough lemon were tested on light soil; both were satisfactory, especially the former. Trees infected with xyloporosis almost invariably showed signs of little leaf in the foliage and fruit. Symptoms of xyloporosis often showed in the scion as well as in the rootstock and sometimes only in the scion.

1860. Taboada, V. L.
Antracnosis sobre frutos de naranjo. **(Anthracnose of orange fruits.)**
Idia, 1953, No. 71, pp. 8-10, illus.

Serious outbreaks of anthracnose (*Colletotrichum gloeosporioides*) occurred in August/September 1953 in

ill-kept, but in no case in well-kept, orange plantations in Tucumán province, Argentina. The symptoms are described. Control is by maintenance of the trees in good health and by sprays of 1% bordeaux mixture or other fungicide before and after flowering.

1861. Fedorinčik, N. S.
Symptoms and course of the disease in citrus plants infected with *Deuterophoma tracheiphila*. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (6): 23-6.

Observations were made on lemon and other citrus trees infected both naturally and artificially with mal secco disease. It was found that the fungus attacks not only the younger branches but also main branches, the stem and roots. The lengths of time required from infection to visible symptoms and then to the death of plants infected through different organs are given. Root infection, most difficult to diagnose, results in earliest death, followed by stem infection. Cutting out of diseased branches is effective only when carried out within 8–10 days of leaf drop and then only on young plants up to 5–6 years old.

1862. Andrade, A. C., and Puzzi, D.
Ensáio de fungicidas para controlar as manchas fúngidas dos citrus. (**Tests of fungicides for the control of fungal spots in citrus.**)
Biológico, 1953, **19**: 144-8, bibl. 1.

An experiment was carried out at Limeira, Brazil, to compare the efficacy of 10 fungicides in the control of scab (*Elsinoë fawcetti*) and melanose and stem-end rot (*Diaporthe citri*) on sour orange. Two applications of 6 l. per tree were made in August. Against scab the best results were given by 1% bordeaux mixture (37% infected fruit), 0·5% copper oxychloride (40%) and 0·5% basic sulphates of copper and zinc (49%), compared with 68% in the control. Against melanose the best results were given by bordeaux mixture (1·8%), basic sulphates of copper and zinc (7%) and copper oxychloride (7%), compared with 27% in the control. Treatment should be given when three-quarters of the petals have fallen.

1863. Jenkins, A. E., Knorr, L. C., and Bitancourt, A. A.
Notes on spot anthracnoses and related subjects. V. Discovery of Tryon's citrus scab in Argentina.
Rev. argent. Agron. B. Aires, 1953, **20**: 230-2, bibl. 7, illus.

Tryon's citrus scab (*Elsinoë fawcetti* var. *scabiosa*) was observed on rough lemon in the province of Entre Rios, Argentina, in 1952. This is the first record of the fungus in the New World.

1864. Klotz, L. J., DeWolfe, T. A., and Masters, L. C.
Septoria control trials in Tulare county.
Citrus Leaves, 1953, **33** (11): 11, and *Calif. Citrogr.*, 1953, **39**: 52.

Six fungicides containing copper and one containing zinc gave effective control of *Septoria* spotting of Valencia oranges. Infection was rather more prevalent on the colder northern sides of trees than on the southern sides, which supports laboratory findings that cold influences infection by *Septoria* [*depressa*].

1865. Suit, R. F., and DuCharme, E. P.
The burrowing nematode and other parasitic nematodes in relation to spreading decline of citrus.
Plant Dis. Reptr, 1953, **37**: 379-83, bibl. 12, illus.
Miller, P. R.
The burrowing nematode and other parasitic nematodes in relation to spreading decline of citrus.
FAO Plant Prot. Bull., 1953, **2**: 36-9.

Investigations in Florida have shown that trees affected by spreading decline have much fewer feeder roots than is normal, and that below 30 in. large secondary roots are usually entirely devoid of feeder roots. Attempts to reproduce the disease experimentally in potted plants were unsuccessful until steps were taken to reduce the soil temperature to levels commonly encountered in the subsoil of groves during summer; once this was done all seedlings grown in decline subsoil, but not those grown in decline topsoil, showed much reduced growth when compared with seedlings grown in healthy soil. The discovery of brown lesions on feeder roots of declining trees and a high nematode population in diseased areas suggested that a nematode might be the causal agent. Examination of 29 affected groves revealed the presence of the burrowing nematode, *Rodopholus similis*, in 28 of them, in some cases at depths as great as 12 ft. Eight other nematodes, some not hitherto reported to infest citrus, were found in one or more decline areas but none could be considered directly responsible for the spreading decline disease.

1866. Martin, J. P.
Soil fumigation for citrus replants.
Amer. Fruit Gr, 1953, **73** (12): 7, 18, illus.

For the control of nematodes and other parasitic organisms found in old citrus soils in California, fumigation with D-D at 600 to 2,400 lb. per acre was found most satisfactory. [See also *H.A.*, 23: 3451 and 24: 795.] It has been noted, however, that even in cases where parasites were apparently not a factor, plant growth has sometimes been stimulated by soil fumigation.

1867. Ortega, J. C.
Treatments for greenhouse thrips and aphids attacking citrus.
Calif. Citrogr., 1953, **39**: 40.
Treatment for control of greenhouse thrips and aphids attacking citrus.
Citrus Leaves, 1954, **34** (2): 24.

Spray schedules giving details of insecticides, time and method of application, and dosage are tabulated for the treatment of Valencia oranges against the greenhouse thrips, *Heliothrips haemorrhoidalis*, and for the treatment of citrus in general against various aphid species.

1868. Rosillo, M. A.
Toxicidad del lindane emulsionable en el "pulgón negro de los citrus". (**Toxicity of emulsifiable lindane to citrus black aphid.**)
Idia, 1953, No. 66, pp. 10-16, bibl. 11, illus.

An account is given of laboratory experiments on the

control of citrus black aphid, *Paratoxoptera argentinensis*, with 12% emulsifiable lindane. Sprays of 0·1, 0·2 and 0·3% gave mortalities of over 60, 60–70 and 91–96% respectively after 24 hours. The highest concentration had a very rapid action, giving up to 100% mortality in 5 hours, and had a 100% residual effect in observations made up to 10 days after treatment.

1869. Ratkovich, M., and Nasca, A. J.
Informe preliminar sobre los ensayos comparativos de lucha contra las moscas de la fruta en Tucumán. **(Preliminary report on fruit fly control experiments in Tucumán.)**
Idia, 1953, No. 71, pp. 31-6.

Three-weekly sprays of 50% DDT at 3‰ from early January until harvesting, and poison baiting were compared for the control of fruit fly (mainly *Anastrepha* spp.) on Robertson Navel (early) and Ruby Blood (midseason) in Tucumán in 1953. Results were good on Robertson Navel in which fruit maturity (March/April) coincides with the period of greatest infestation. Infestation was low when Ruby Blood matured and neither treatment was efficacious.

1870. Lespes, L.
Comparaison de plusieurs procedes de lutte contre la ceratite sur clémentiniers, en 1949. **(Comparison of several methods of control of *Ceratitis* on clementines in 1949.)**
Terre maroc., 1953, **27**: 422-3.

The percentages are given of fruit fly attack in consignments of clementine oranges that had received 1–6 attractant sprays of arsenic in molasses, 1–3 DDT cover sprays, or 1 spray of each. Single arsenic and DDT sprays reduced attack to 21% and 18% respectively (control 35%) while 3 treatments reduced it to 14% and 11% respectively. Only the 6 arsenic sprays (9%) were better than 3 DDT sprays. The DDT treatment was much the more expensive and, by destroying parasites, resulted in a subsequent increase of *Icerya* scale.

1871. Leonardi, C.
Esperimenti di lotta contro la *Ceratitis capitata* Wied. su loto e agrumi con prodotti organici di sintesi. **(Experiments on the control of *Ceratitis capitata* on persimmon and citrus with synthetic organic insecticides.)**
[English summary 7 lines.]
Ann Sper. agrar., 1954, **8**: 271-82.

Various DDT and parathion preparations, DDT plus parathion, and summer oil plus parathion were tested at Salerno in 1952, 3 treatments being given at 10-day intervals in October/November. 50% DDT wettable powder at 1%, and 1% white summer oil plus 20% parathion emulsion at 0·1% gave the best results. The rates of attack on persimmon were DDT 16%, mixture 19% and control 56%, and on citrus 7, 5–6 and 40.

1872. Griffiths, J. T., and Thompson, W. L.
Grasshoppers in citrus groves.
Bull. Fla agric. Exp. Stats **496**, 1952, pp. 26, bibl. 14, illus.

The American grasshopper, *Schistocerca americana americana*, occasionally causes severe defoliation in Florida citrus groves. Recommended control measures are clean cultivation from February to mid-May and again after mid-August, and spraying or dusting with chlordane, toxaphene, parathion or BHC. Notes are also given on other less important grasshoppers.

1873. Thompson, W. L.
Materials for purple mite control.
Citrus Ind., 1953, **34** (11): 8, 13.

The results of 7 spraying experiments on Florida citrus are summarized. Although oil emulsions remain the most effective of the acaricides tested against purple mite they can only be used for a limited period each year. Other materials that have given good control are DN Dry Mix (40% dinitro-o-cyclohexyl phenol), ovotran (50% chlorophenyl, p-chlorobenzene sulphonate), aramite (15% beta-chloroethyl-beta-(p-tertiary butyl phenoxy)-alpha-methyl ethyl sulphite), and, in cool weather only, DN-111 (20% dinitro-o-cyclohexyl phenol, dicyclohexylamine salt).

1874. Vergani, A. R.
Generalidades sobre el uso del parathion. **(Notes on the use of parathion.)**
Idia, 1953, No. 71, pp. 16-19, bibl. 12, illus.

After a short review of overseas practice the author records that parathion wettable powders have already given promising results against Australian red scale (*Aonidiella aurantii*) in Concordia, namely 99·5% mortality with 15% parathion at a concentration of 0·42%; and 98, 98 and 90% with 25% parathion at 0·4, 0·33 and 0·3% respectively.

1875. Jenkins, C. F. H., Shedley, D. G., and Edwards, B. A. B.
White wax scale.
J. Agric. W. Aust., 1953, **2**: 705-11, bibl. 6, illus.

In addition to citrus the African white wax scale, *Ceroplastes destructor* (formerly referred to in Western Australia as the Indian wax scale, *C. ceriferus*), attacks pear, persimmon, apricot and apple (but usually only if in close proximity to infested citrus), and some indigenous and exotic ornamental trees and shrubs. Good control is obtained by contact spraying with 1 gal. white oil in 40 gal. water soon after the main emergence of larvae in late December and again a fortnight later, or with 1 in 40 white oil plus 4 oz. soda ash (or 10 oz. washing soda) per gal. at the late peak stage (March).

1876. Bartlett, B. R.
Retentive toxicity of field-weathered insecticide residues to entomophagous insects associated with citrus pests in California.
J. econ. Ent., 1953, **46**: 565-9, bibl. 4, illus., being *Pap. Calif. Citrus Exp. Stat.* **762.**

The materials most deleterious to beneficial insects, in decreasing order of toxicity, were DDT, parathion, lime-sulphur, TDE, EPN, and sulphur. Under arid conditions dusts were more injurious than sprays of the same materials.

1877. Sysoev, A. T.
The possibility of combining biological and chemical methods in the control of pests of agricultural plants. [Russian.]
Doklady vsesojuz. Akad. seljsk. Nauk, 1953, **18** (7): 26-31.

Cryptolaemus montrauzieri is an effective predator giving 90–95% control of the mealy bugs *Pseudococcus citri*, *P. gahani* and *P. maritimus* which attack citrus and other sub-tropical fruit, vegetable and ornamental plants. In laboratory and field trials at Sočin in 1950 and 1951 populations of *C. montrauzieri* liberated on the day following chemical treatment were not affected by the following materials applied for pest or disease control: lime-sulphur, 2% oil emulsion, 1% bordeaux, anabasine-sulphate solution and hydrocyanic acid fumigation. DDT and BHC had very unfavourable after-effects, but sulphur dust under certain conditions could be applied prior to liberating the predator.

1878. Gunther, F. A., Reynolds, H. T., and Jeppson, L. R.
Field compatibility of aramite and sulphur in California.
J. econ. Ent., 1953, **46**: 674-7, bibl. 4, being *Pap. Calif. Citrus Exp. Stat.* **764.**

The presence of sulphur in aramite (2-p-tert-butylphenoxy) isopropyl-2-chloroethyl sulphite) formulations, applied to lemon, lima beans and cotton, did not appear to affect the half-life values (time required for given deposit values to decrease to one half) of the resulting residues.

1879. Vergani, A. R.
Ensayos de fitotoxicidad con distintos tipos de aceites minerales insecticidas. **(Phytotoxicity tests with insecticidal mineral oils.)**
Idia, 1953, No. 72, pp. 11-15.

Twelve different mineral oils with viscosities ranging from 67 to 110 sec. Saybolt and unsulphonated residues ranging from 70 to 92% were used at concentrations of 0·75–2·0% in trials on 2 mandarin varieties, one late sweet orange (Lue Gim Gong) and one grapefruit variety in Concordia district in 1952/53. Four applications were made, viz. post-floral (23 October), before the fruits averaged 20 mm. diameter (12 December), when they were 20–35 mm. (29 January) and at the end of March. Tables are presented which show the degree of defoliation caused, numbers of fallen fruit, and final yield. The most suitable oils for the common mandarin were those with a viscosity of 78–80 sec. Saybolt and an unsulphonated residue of 90–92%; for Campeona mandarin, Lue Gim Gong and grapefruit the corresponding figures were 55–79 sec. and 70–92%, 80–110 sec. and 75–85%, and 55–81 sec. and 70–92% respectively. In general January–March was the safest period for treatment.

1880. Prosser, D. S., and others.
The Florida citrus grove duster.
Bull. Fla agric. Exp. Stats **481,** 1951, pp. 15, illus.

The specifications and performance are described of an economical duster developed by the Station since 1948 with a view to overcoming the disadvantages of previous dusters. It is built with standard parts, may be mounted on a trailer or a truck bed and can be powered with a petrol engine or a power take-off. Only a driver and an operator are required and the latter is completely protected from all branches. In tests it gave more even distribution of dust than other types, and a better kill of purple mites.

1881. Cook, J. B.
Protecting young trees from gophers.
Calif. Citrogr., 1954, **39**: 72, 89-90.

Methods are described for poisoning gophers with strychnine vegetable baits and for gassing them in their runways with carbon bisulphide, methyl bromide and calcium cyanide. These methods are economical and should be used before the trees are planted wherever gopher populations are large. Subsequently gophers can be kept down effectively by trapping. Wire netting collars, with the wire set not less than 18 in. below the soil surface, may also be used to protect trees.

1882. Ratkovich, M., and Nasca, A. J.
El control de los "ocultos" mediante el cianuro de calcio. **(Control of "ocultos" by calcium cyanide.)**
Idia, 1953, No. 71, pp. 40-3, illus.

Ctenomys sp., a tunnelling rodent, causes considerable damage to citrus in Tucumán province by cutting small roots, gnawing the bark of larger ones and, in severe attacks, killing the trees by gnawing the bark at the collar. Placing calcium cyanamide powder by hand in the tunnels gives good control.

Citrus—harvesting, packing, storage and products.

(*See also* 1231, 2014.)

1883. Powers, J. B., Gunn, J. T., and Jacob, F. C.
Electronic sorting of lemons.
Calif. Agric., 1953, **7** (11): 8, 14, illus.

A short account is given of an experimental photoelectric sorter, which has proved capable of separating lemons into the 5 well-defined colour categories commonly used in commercial packing houses. Such treatments of the fruit surface as washing and waxing have not affected accuracy. It may be necessary to increase the capacity of the machine which at present sorts 4 to 5 lemons per second. [See also *H.A.*, 23: 4530.]

1884. Kurokami, T., and others.
Studies with phytohormone treatments in controlling abscission of summer oranges. II.* [Japanese, with English summary ½ p.]
Tech. Bull. Kagawa agric. Coll., 1952, **4**: 111-23, bibl. 37.

In the summer orange varieties Iyomikan and Hassaku 32–100 p.p.m. 2,4-D or 2,4,5-T plus 2,4-D spray or coating treatment immediately after picking controlled calyx abscission, especially at the higher concentrations, but colour retention by the calyx was not consistent.

1885. Long, J. K.
Control of mould wastage in citrus fruit.
Food Pres. Quart., 1953, **13**: 73-4.

The latest report of the Citrus Wastage Research Laboratory, Gosford, N.S.W., indicates: (1) A new dip consisting of a mixture of sodium orthophenylphenate (Dowicide A in the U.S.A.) and hexamine shows promise of controlling green mould better than the standard borax-boric acid-wax dip. (2) Diphenyl wraps have proved as effective as borax dips in controlling green mould and more effective in reducing

* For an abstract of Part I see *H.A.*, 23: 2174.

stem-end rots; the problem of tainting, however, needs further investigation. (3) With oranges not treated against decay clipping has consistently given better control of green mould than pulling, but with borax-treated fruit this difference disappeared. (4) The use, in conjunction with a detergent bath, of transverse rotating scrubbing brushes with ample overhead sprays of clean hot water reduced the natural mould spore load on Washington Navel oranges from 56,000 spores to about 900 spores and wastage after 2½ weeks common storage from 8·3% to 2·4%. (5) Lemons were kept in good condition for 6 months in orchard shed storage when they were dipped immediately after picking in a solution containing 500 p.p.m. 2,4-D plus 0·25% shirlan W.S.; stem-end rot was greatly reduced and 85% of the buttons retained their colour. [See also *H.A.*, 24: 801.]

1886. Lauriol, F.
Les traitements chimiques des *Penicillium* des agrumes. (The chemical treatment of citrus moulds.)
Fruits d'Outre Mer, 1954, **9**: 3-15, bibl. 16, illus.

This third and last article on the protection of citrus fruits from *Penicillium* moulds [see *H.A.*, 22: 2975 and 23: 2199] is concerned with borax treatment, tests with other fungicides (which yielded no practical results), preliminary experiments with growth substances (which caused some dehydration), and wax emulsions. The chief practical conclusions were (1) borax treatment should consist of a 3–4 min. dip in a 10% solution at 45° C. (15–17° C. minimum if sodium pentaborate is used) within 36 hours (optimum 12 hours) of picking; (2) borax treatment will not prevent the rotting of fruit subsequently injured and contaminated and to reduce such losses fruit should be packed carefully, preferably wrapped in paper, and the atmosphere should be sprayed with diphenyl or quaternary ammonium; further borax treatment is necessary before storage for a long period; (3) wax emulsions reduce desiccation losses by 50%, which is equivalent to saving a loss of 3–6% on the total weight of citrus consumed.—Lab. Déf. Cult., I.F.A.C.

1887. Nadel-Schiffman, M.
Contact transmission of *Diplodia* rot in Shamouti orange fruits.
Palestine J. Bot. (*R*), 1953, **8**: 193-5, bibl. 5.

Experiments showed that sound Shamouti oranges began to show superficial blemishes after 2–3 weeks' contact with fruit infected with *Diplodia natalensis*, and *Diplodia* was subsequently isolated from the blemishes. There seems little likelihood, however, of such transmission under normal export conditions involving a transit period of 3–4 weeks, since the incubation and contact transmission periods combined total 4–6 weeks.

1888. Littauer, F., and Gutter, Y.
Diphenyl-resistant strains of *Diplodia*.
Palestine J. Bot. (*R*), 1953, **8**: 185-9, bibl. 5.

Some strains of *Diplodia natalensis*, causal agent of stem-end rot, were found to be resistant to diphenyl. Although they induced rot in Shamouti oranges they proved much less pathogenic than normal diphenyl-sensitive strains.

1889. Hendrickson, R., and Kesterson, J. W.
Citrus by-products of Florida. Commercial production methods and properties.
Bull. Fla agric. Exp. Stats **487**, 1951, pp. 56, bibl. 51, illus.

This comprehensive bulletin describes general processing procedures, composition and utilization of the following citrus products: pulp and molasses, peel oil (cold-pressed and distilled), alcohol, feed yeast, seed oil, bland syrup and pectin; and mentions several other products that might be worth developing.

1890. Ma, R. M., and Schaffe, P. S.
β-sitosteryl D-glucoside and β-sitosterol from commercially dried grapefruit pulp.
Arch. Biochem., 1953, **47**: 419-23, bibl. 4.

Both compounds, which had a low order of anti-fungal activity, were found to be identical with those isolated from orange juice.

Macadamias.

1891. Schroeder, C. A.
Investigations on the macadamia nut.
Citrus Leaves, 1953, **33** (11): 22, 24, illus.

The research programme being carried out by the Department of Subtropical Horticulture, University of California, Los Angeles, is outlined. The selection and evaluation of varieties is a prominent feature and the collection now consists of local seedlings, mainly *M. ternifolia*, and introductions from Hawaii, mainly *M. integrifolia*, and from Queensland. Selection is based mainly on fruit yield and quality, quality being based on nut size, shell thickness, and oil percentage. Observations suggest that ternifolia varieties are less subject to chlorosis than integrifolias. In propagation budding has been unsuccessful, but dormant grafts have given good results and tip cuttings of rather hard wood have been found to root readily. A tendency towards biennial bearing has been observed in seedling trees.

Olives.

(*See also* 1912b, g, 2100.)

1892. Noro, K.
Bibliographical studies on the olive tree. III and IV. [Japanese, with English summaries 18 and 10 lines respectively.]
Tech. Bull. Kagawa agric. Coll., 1953, **4**: 193-205, bibl. 84, and **5**: 64-78, bibl. 84.

Notes are given on the present status of olive growing in Japan and the review of world literature on olives is continued. [Many of the references are from *H.A.* For Parts I and II see *H.A.*, 22: 3364 and 23: 2216p.]

1893. Plaza Prieto, J.
La oleicultura en la economia nacional. (Olive growing in the [Spanish] national economy.)
Bol. Oleic. int., 1953, **3** (16): 3-16, bibl. 20.

The place of olive growing in Spanish agriculture and in the economy of the country as a whole and of the individual provinces, and the social and economic aspects of the Spanish olive grove are discussed. For the period 1939-48 the value of production stood fairly steadily at about 6·85% of that of total agricultural production.

Andalusia supplies about 70% of the national production of olive oil, the chief oil-producing provinces being Jaen (28% of total), Cordoba (18%) and Seville (12%). Olives are the chief crop in these 3 provinces and also in Malaga and Lerida. Statistics are also given for yield and value of olive products by provinces.

1894. Pech, H.
La culture des oléagineux en Syrie. (**Oil plant growing in Syria.**)
Oléagineux, 1953, **8**: 747-52.

The olive is the chief oil plant of Syria. Notes are given on the main varieties grown in various districts on the coast and in the hinterland and on propagation, spacing, pruning, intercrops and pests.

1895. Baldini, E.
Contributo allo studio delle razze di olivo coltivate in Toscana. Indagini condotte in provincia di Firenze. (**A contribution to the study of the olive varieties grown in Tuscany. Investigations in the province of Florence.**) [English summaries 7 and 10 lines.]
Ann. Sper. agrar., 1953, **7**: 1675-1700, 1853-1885, bibl. 27, illus.

This paper concerns ovary abortion and compatibility studies on the 16 chief varieties, pollination studies on the 2 commonest varieties, Frantoio and Moraiolo, and a morphological description of the other 14 varieties. These 14 varieties are then classified according to ovary abortion rate, self-fertility, their value as pollinators for Frantoio and Moraiolo, their resistance to cold and to high winds, and their fruit and oil yield. Finally recommendations are made regarding suitable planting mixtures.

1896. Francesconi, F.
Contributo allo studio delle razze di olivo dell'Umbria. (**Contribution to the study of the olive varieties of Umbria.**) [English summary 5 lines.]
Ann. Sper. agrar., 1953, **7**: 1709-30, bibl. 14, illus.

Notes are given on soils, climate and cultural practices in the Trevi and Foligno communes and on the chief olive varieties cultivated, namely Moraiolo, Leccino (recommended for the plain), Olivoce, Razzo, and an unnamed variety. A variety encountered at Gualdo Tadino is tentatively recommended for the hill zone.—Inst. Colt. arb. Univ., Perugia.

1897. Noro, K., and Inoue, T.
A method of raising olive seedlings. Presowing treatment of olive seed and morphological studies after germination. [Japanese, with English summary ¾ p.]
Tech. Bull. Kagawa agric. Coll., 1953, **4**: 159-69, bibl. 12, illus.

The pre-treatment of olive seed recommended consists of disinfection with uspulun and exposure to 40° C. for 17 hours. Autumn sowing in electrically heated soil (1 part loam to 2 parts sand) gave better results than spring sowing. The seedlings were transplanted to the nursery in late March and budded in the autumn or grafted the following spring. The raising of olive seed in glasshouses, which is common practice in Japan, was found to be unnecessary. The root system of seedlings developing at a rate slower than normal is liable to insect attack. In such cases the roots should be cut off and the seedling planted in sand where new roots will develop within 10 days. Methods of seed selection from the Mission variety and the effect of soil temperature on germination are also discussed. The data are tabulated with English captions.

1898. Sergeeva, K. A.
The initiation and development of flower buds of the olive. [Russian.]
Agrobiologija, 1952, No. 4, pp. 145-7, illus.

A brief account of microscopical observations made on bud development in olive showing that floral differentiation occurs about 2 months before full bloom.

1899. Noro, K.
Preliminary report on the nucleus division and chromosome numbers in *Olea europea* L. [English, with Japanese summary.]
Tech. Bull. Kagawa agric. Coll., 1953, **4**: 180-4, bibl. 5, illus.

Cytological studies were carried out on olives in an attempt to elucidate the cause of sterility in a Mission grove which flowers abundantly every year but does not set fruit in the presence of pollinators. No explanation has, as yet, been advanced.

1900. Bouat, A., Renaud, P., and Dulac, J.
Étude de la nutrition de l'olivier par le diagnostic foliaire. (**Study of olive nutrition by foliar diagnosis.**)
C.R. Acad. Agric. Fr., 1953, **39**: 772-6.

The nitrogen content of the olive leaf varies in the same manner during each of the 3 years of the leaf's life. High at the beginning of spring growth, leaf N falls up to the time of stone hardening and then rises to a maximum at the time of ripening [see also *H.A.*, 24: 820]. The N which supplies the needs of growth and fruiting comes partly from the reserves in the leaf and partly from the soil. It may be concluded that under good conditions of soil and climate the reserves in the leaf are hardly touched but that under poor conditions, on the contrary, growth and fruiting are poor unless the previous autumn was favourable for the accumulation of N reserves. The effect of the commonly practised heavy pruning, designed to hasten fruiting in young trees and to encourage new wood in adult trees,, is merely to postpone flowering for several years. Fertilizers which yield their N gradually should be applied before growth flush and smaller applications of rapidly assimilable fertilizers should be made at flowering and fruit set and, if water is available, at stone hardening. Winter leaf analysis can indicate the likelihood of flowering, the type of pruning required and the harvest to be expected.

1901. Mort, C. H.
Olive tree pruning.
Agric. Gaz. N.S.W., 1953, **64**: 529.

Experiments at Wagga Agricultural College and Experiment Station show that regular bearing and improved fruit quality can be induced in the olive by pruning. A systematic thinning takes place in the early spring before an "on" year and subsequently in alternate years, all overcrowded and weak wood being removed. Yields from 2-tree plots of pruned and unpruned Manzanillo from 1950 to 1953 inclusive were 184, 137, 85 and 180 (total 586) lb., and 275, 7, 164 and 4

(total 450) lb. respectively. The expense of systematic pruning may not be justified in the oil varieties as small fruit is just as valuable as large.

1902. Ciferri, R., and others.
Anomalie fogliari dell'olivo ligure e gardesano. (**Leaf abnormalities of the olive in Liguria and Garda.**) [English summary 13 lines.]
Ann. Sper. agrar., 1953, **7**: 1957-76, bibl. 22, illus.

Olive leaf abnormalities are described and illustrated in this paper by a team of 6 experts. Macrophylly, microphylly and the development of lobes on leaves appear to be associated with leptonecrosis but sickle-shaped deformation, which is much more common, may be due to another cause.

1903. Nicolini, J. C.
Parálisis parcial, la nueva enfermedad del olivo en la Argentina. (**Partial paralysis, the new olive disease in Argentina.**)
Bol. Oleic. int., 1953, **3** (17): 45-7, bibl. 1, illus.

Further notes on a virus disease previously reported [see *H.A.*, 21: 1455] with recommendations for preventive measures.

1904. Modugno Pettinari, C.
Diffusione, biologia e terapia di *Cercospora cladosporioides* Sacc. parassita dell'olivo in Italia. (**Distribution, biology and control of *Cercospora cladosporioides*, parasitic on olive in Italy.**) [English summary 7 lines.]
Boll. Staz. Pat. veg. Roma, 1952 (issued 1953), **10**: 233-43, bibl. 12.

Investigations begun in 1949-50 showed that (1) cercosporiosis had spread to all the olive-growing districts of Italy; (2) the fungus attacks the leaves of all varieties and occasionally young shoots, but not the fruit. Biological and morphological notes on the pathogen are given. The most susceptible varieties are listed; these include almost all the large-fruited pickling varieties. Leccina, Elcina and Carbonella are less susceptible. Fairly good control is obtained by treatment with 2% bordeaux mixture in May, after the early rains of August–September and at the end of the harvest. Control experiments are to be the subject of a further report.

1905. Sarejanni, J. A., and Papaïoannou, A. J.
La pathologie des mycoses à *Macrophoma* des olives. (**The pathology of *Macrophoma* rot of olives.**)
Ann. Inst. phytopath. Benaki, 1952, **6**: 39-50, bibl. 14, illus.

This paper includes a brief note on the control of *Macrophoma* (=*Sphaeropsis*) *dalmatica* and *Septoriella oleae*, which are introduced into olive fruits by gall midges, *Prolasioptera berlesiana*, entering through punctures made by *Dacus oleae*. The only practical means of controlling the fungal attack today is the indirect one of controlling *Dacus oleae*.

1906. Heimann, H., and Ratner, R.
Cation exchangers from olive pits.
Bull. Res. Coun. Israel, 1953, **3**: 96-7, bibl. 13.

A process is described for the preparation of exchangers from olive stones, the exchange capacity of which is comparable to that of commercial exchangers of the same type.—Israel Inst. Tech., Haifa.

Passion fruit.

1907. Malan, E. F.
The production of granadillas.
Fmg S. Afr., 1953, **28**: 407-10, bibl. 6.

This short account of passion fruit (*P. edulis*) growing in South Africa includes information on climatic and soil requirements, propagation from seed, planting and spacing, training and pruning, manuring, irrigation, harvesting, yields, diseases and pests.

Tung.

(*See also* 2099.)

1908. Lagasse, F. S., and others.
U.S. field laboratory for tung investigations.
A.R. Fla agric. Exp. Stats 1951/52, pp. 109-11.

Budded versus seedling trees. In a trial planted in 1946 with budded and seedling progenies of 8 selections, the seedling trees have made the better growth and borne significantly more fruit. A more detailed study of budded and seedling trees has been started. *Weed control in nurseries.* Storing seed for 30 days in moist shavings at 45° F. resulted in quicker and more uniform germination. Weed competition can be largely avoided by combining this treatment with later planting. Among 15 herbicides tested sinox (ammonium dinitro-ortho-secondary butyl phenol) at 40 lb. per acre of treated soil and fuel oil at 500 gal. per acre of treated soil gave the best control of weeds and stand of tung seedlings. *Factors affecting growth of newly transplanted tung trees.* Observations indicate that newly planted tung trees produce many fewer feeder roots under weeds than under clean cultivation even though nutrients and soil moisture may be maintained at high levels. *Effects of N, P, K and Ca on yield and oil content of tung trees.* Tung trees planted in 1942 received 2 levels each of N, P, K and Ca. Only N increased crops significantly. No treatment affected the oil percentage.

1909. Chavancy, A.
Abrasin. (**Tung.**)
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 13-47, illus.

Studies took place on flowering, fruiting, yields, growth rates, types of shoots, effect of ring barking on flowering and fruiting (little effect), and tree forms. Following experimental injection of dyes into leaves, growing tips and branches to determine rates of absorption, various nutrient solutions were injected into branches of 10–20 cm. in diameter. Absorption was rapid for the first 24 hrs, diminished gradually up to the 5th day and was then low (20–40 c.c. per 24 hrs); after a week it was negligible. The rate of absorption appeared to vary with the solution; with magnesium sulphate, for example, it began and diminished more quickly than with copper sulphate.

1910. Bagot, Y.
Les huiles de tung et d'abrasin. (**Tung oils from *Aleurites fordii* and *A. montana*.**)
Oléagineux, 1953, **8**: 581-93, 689-97, 761-71, 861-3, bibl. 59, illus.

This review article deals in some detail with world production and consumption of tung oil, the storage and preparation of the seed before extraction (including the effects of moisture exchange, of humidity and temperature on acidity and oil yield, and of the drying technique on the quality and behaviour of the oil), processing, the composition, properties and characteristics of the oil, and the chief uses of the oil and of its by-products.

1911. Choudhury, D. K., and Chakravarty, M. M.
Tung oil from the tea garden areas in North Bengal.
Sci. and Cult., 1953, **19**: 260-1, bibl. 4.

The physical characteristics and the composition are given of tung oil from North Bengal. It is believed that the quality of the drying oil will not be materially affected by its low content of elaeostearic acid.—Univ. Coll. Sci. Tech., Calcutta.

Noted.

1912.

a Anon.
Septoria spot of citrus.
Agric. Gaz. N.S.W., 1953, **64**: 548-9.

b Arzee, T.
Morphology and ontogeny of foliar sclereids in *Olea europaea*. I. Distribution and structure.
Amer. J. Bot., 1953, **40**: 680-7, bibl. 38, illus.

c Banfi, A., and Beñatena, H. N.
Aplicación de la poliembronía en la diferenciación de pomelos y toronjas. (**The application of polyembryony for differentiating between grapefruit and shaddock.**)
Idia, 1953, No. 71, pp. 13-15, bibl. 3.

d van den Bosch, R.
Search Africa for natural enemies of black scale and other citrus pests.
Citrus Leaves, 1953, **33** (12): 11-12, bibl. 3, and *Calif. Citrogr.*, 1954, **39**: 72, bibl. 3.

e Childs, J. F. L.
Observations on citrus blight.
Citrus Ind., 1954, **35** (1): 5-7, 14, bibl. 9, illus.
A review of work on blight or root rot associated with a complex of fungi.

f Herzfeld, E. W.
Investigaciones sobre exocortis. (**Studies on exocortis.**)
Idia, 1953, No. 71, pp. 37-8.
Experiments in progress at Concordia, Argentina.

g Issa, E.
Doenças em oliveiras quarentenadas. (**Diseases in imported olive plant material.**)
Biológico, 1953, **19**: 93-8, bibl. 7, illus.
Imported by Brazil from Portugal.

h Jones, W. W., and Cree, C. B.
[Citrus] leaf potassium.
Calif. Agric., 1953, **7** (11): 10, 15.
For another account see *H.A.*, 23: 3432.

i Klotz, L. J.
Observations on citrus in Spain.
Calif. Citrogr., 1953, **39**: 40, 50-1.

j Maĭsuradze, N. I.
New varieties of grapefruit and pomelo. [Russian.]
Agrobiologija, 1951, No. 4, pp. 116-20, illus.
Developed at Suhum.

k Maymone, B., and Battaglini, A.
Ricerche sulla digeribilità e sul valore nutritivo del "germe" di carruba (*Ceratonia siliqua* L.). (**Research on the digestibility and nutritive value of the carob "germ" (*Ceratonia siliqua*.)**
Ricerche sul valore nutritivo delle polpe di carrube esaurite, residuate dalla preparazione industriale dell'alcool. (**Research on the nutritive value of carob bean pulp, a by-product of the industrial production of alcohol.**) [English summaries ½ and ¼ p.]
Ann. Sper. agrar., 1953, **7**: 1977-84, illus., 1985-99, bibl. 3.

l Mijušković, M.
Neke bolesti i štetočine agruma na crnogorskom primorju. (**Some diseases and pests of citrus in Montenegro.**) [French summary 1½ pp.]
Zasht. Bilja, 1953, No. 19, pp. 47-60, bibl. 9, illus.

m Muma, M. H.
Lady beetle predators of citrus whiteflies.
Citrus Mag., 1953, **16** (3): 12-13, 37, illus.

n Ratkovich, M.
Control de la cochinilla roja australiana con la fumigacion cianhidrica de los citrus bajo carpas. (**Red scale control by HCN fumigation of trees under tents.**)
Idia, 1953, No. 71, pp. 43-9, illus.

o Smith, A. J.
The citrus red mite.
Fmg S. Afr., 1953, **28**: 340, 344.
Metatetranychus citri and its control.

p Turica, A.
Fauna entomológica en los cítricos del Delta. (**Insect and mite pests of citrus in the Delta [Argentina].**)
Idia, 1953, No. 71, pp. 10-11.

TROPICAL FRUIT AND PLANTATION CROPS.

General.

(*See also* 1076, 1146, 1250, 1814, 2078a, l, p, v, 2079g, j, 2084, 2085, 2086, 2092, 2114, 2116, 2118, 2119b, f, i, j.)

1913. Coolhaas, C., Duynhouwer, D. J., and Haak, A. H.
The teaching of tropical agriculture in Europe—I: The Netherlands.
Trop. Agriculture Trin.,* 1954, **31**: 33-9.

Short accounts are given of the courses in tropical agriculture provided by (1) the Agricultural University College at Wageningen, which provides education up to M.Sc. standard; (2) the State College for Tropical Agriculture at Deventer, which provides a practical course for prospective planters; and (3) the recently established International Agricultural Study Centre at Wageningen which provides special post-graduate courses for foreign students.

1914. Commonwealth Economic Committee.
Plantation crops.
[*Publ.*] *Commonw. econ. Cttee*, 1954, pp. 144, H.M. Stationery Office, Lond., 5s.

This fourth post-war issue of *Plantation Crops* gives a summary of figures of world production, trade and consumption relating to sugar, tea, coffee, cocoa, spices, tobacco and rubber for the period 1937 to 1952 inclusive.

1915. Malaya Department of Agriculture (Voelcker, O. J.).
Annual Report of the Department of Agriculture for the year 1952, 1953, pp. 65, $2.

This report includes information on: *oil palm:* breeding and selection, nutrition and soils, leaf analyses, aluminium toxicity, pests and diseases; *coconut:* selection and breeding, pests; *pineapple:* selection, pests, diseases; *cacao:* breeding and selection, vegetative propagation, fermentation, pests and diseases; *tea:* selection, fermentation and copper status, pests and blister blight; *fibres:* ramie, Manila hemp; *vegetables*; *banana*; *citrus*; *clove*; *derris*; *candlenut*; and *canning research* on pineapple and papaw.

1916. Chavancy, A., Lanfranchi, J., and Guinard, A.
Compte rendu des travaux du Centre d'Expérimentation agronomique de Blao en 1950–1951–1952. **(A report on the work of the Blao Agronomic Research Station in 1950, 1951 and 1952.)**
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 136, illus.

Tung (*Aleurites montana*), ramie, tea, coffee and pepper [see separate abstracts on these crops]; *Tithonia* as a cover crop and for compost.

1917. Keen, Sir B., Duthie, D. W., and others.
Crop responses to fertilizers and manures in East Africa.
E. Afr. agric. J., 1953, **19**: 19-57.

This report of a conference of a specialist committee on soil fertility is divided into 3 parts: (1) Introduction by Sir Bernard Keen; (2) Review of papers and discussion by D. W. Duthie; and (3) Summaries of papers. Summaries include: The effect of fertilizers and manures [including mulches] on pyrethrum yields, by U. Kroll; The responses of wheat, tobacco and pyrethrum to fertilizers in the Southern Highlands of Tanganyika, by J. S. Gunn; Crop [including clove and pineapple] responses to fertilizers and manures in Zanzibar, by G. E. Tidbury; Effects of fertilizers and manures [including mulches] on Kenya coffee, by H. C. Pereira; A review of the fertilizer and mulch experiments on *Coffea arabica* in Tanganyika, by F. R. Sanders; The manuring of tea, by T. Eden; and Sisal manurial trials, by G. W. Lock.

* Now published in England.

1918. Constable, D. H.
Chlordane: a new insecticide in Ceylon.
Quart. Circ. Ceylon Rubb. Res. Inst., 1953, **29** (1/2): 13-15.

The Ceylon red ant, *Oecophylla smaragdina*, nests in various trees, particularly citrus, mangoes, rubber and tea. In trials against nests on tea 2 sprays of 0·5°/$_{oo}$ chlordane applied at an interval of 24 hours gave effective control in dry weather.

1919. Vilardebo, A.
Le problème de la lutte contre *Zonocerus variegatus*. Les résultats acquis en Guinée. **(Control of *Zonocerus variegatus*. Results achieved in French Guinea.)**
Vuillaume, M.
Moyens de lutte préconisés contre *Zonocerus* en Côte d'Ivoire. **(Measures recommended for the control of *Zonocerus* in the Ivory Coast.)**
Fruits d'Outre Mer, 1953, **8**: 448-50, illus., and 451-2, bibl. 2.

Citrus, banana, coffee and pineapple are among the crops attacked by the cricket *Zonocerus variegatus*. Control recommendations for French Guinea are (1) control of newly hatched hoppers by chlorinated hydrocarbon insecticides (for BHC 120–130 g. active ingredient per ha.); (2) control of adults by spraying at thrice the rate used for hoppers; and (3) maintenance of a cleared strip round plantations with a view to preventing invasion. Control recommendations for the Ivory Coast are (1) destruction of newly hatched hoppers with BHC or DDT; (2) keeping a watch on plantation boundaries at hatching time; (3) early morning or late evening treatment of hoppers congregated at their night's resting place; (4) applications of several fortnightly treatments during hatching; (5) use of bait where the crickets are congregated and most easy to reach.

Bananas.

(*See also* 1512, 2078k, q, z, 2079h.)

1920. Wills, J. M., and Berrill, F. W.
The banana.
Qd agric. J., 1953, **77**: 197-210, 259-77, illus.

The paper begins with a historical note on banana growing in Queensland. The crop is now cultivated along the whole coastal strip from the New South Wales/Queensland border to Mossman, but chiefly south of Gympie. In 1952/53 the area in production

was 8,700 acres. The main commercial varieties are Cavendish, the semi-dwarf Mons Mari and Williams Hybrid (both bud mutations from the dwarf Cavendish), the tall Lady Finger and Sugar, and the tall Anamalu introduced from Ceylon some years ago. Notes are given on preparation of land, planting material and planting, manuring, cultivation and weed control, cover cropping (generally poona pea), mulching (preferably with grass), crop control (including selection of followers and desuckering), trashing, bunch propping, winter bunch covering, harvesting, aerial wire transport to packing shed, packing, artificial ripening (0·1–0·3% coal gas at 85% R.H. and 65–70° F. for 5–7 days for Cavendish and Mons Mari; similar treatment but higher temperature for Lady Finger), legislation (prior permission for planting, compulsory control of disease and total destruction of plantation at end of cropping period), crop eradication (1% 2,4-D or MCPA injected into the heart at 5–15 c.c. per plant according to size preferably during summer or autumn, followed by spraying regrowth with 0·2% solution).

1921. Shepherd, K.
Seed fertility of the Gros Michel banana in Jamaica.
J. hort. Sci., 1954, **29**: 1-11, bibl. 7.

Results are reported of an analysis of female fertility in the Gros Michel banana, a nearly female-sterile parthenocarpic triploid. Seed yields are found to vary with locality and time, with the size of inflorescence, the intensity of pruning, the time of day at which pollination is done and the degrees of parthenocarpic development of the fruit. Seeds are non-randomly distributed within the fruit bunch, proximal flower-clusters being considerably more fertile than distal ones. Within the fertile fruits, the seeds are localized at the stylar end. General features of seed fertility in parthenocarpic bananas and the practical implications of this work for banana breeding are discussed. [Author's summary.]

1922. Pélegrin, P.
L'utilisation des engrais en culture bananière. (**The use of fertilizers in banana growing.**)
Fruits d'Outre Mer, 1953, **8**: 453-8.

Mineral fertilizer requirements were found to be 4–5 tons per ha. in French Guinea (*Musa sinensis*), 3 in Guadeloupe (Poyo) and 2 in the French Cameroons (Gros Michel). The fertilizer should be rich in K; 6–7–28 was in general a suitable formulation; 3–5 times as much K_2O as N is required. Results from split applications did not justify the increased cost. Ca, Mg and organic manure play an important supporting part in banana nutrition.

1923. Cooil, B. J., and Shoji, K.
Observations and experiments on the control of a chlorosis of Cavendish bananas.
Progr. Notes Hawaii agric. Exp. Stat. **87**, 1953, pp. 1-4, from abstr. in *Biol. Abstr., Sect. D*, 1954, **28**, No. 2112.

Chlorotic Cavendish banana plants were found growing in a slightly alkaline, calcareous soil. Chlorotic leaves contained 3·4 p.p.m., green leaves 8·9 p.p.m. Fe. Chlorophyll concentration and growth were increased by repeated spraying with $FeSO_4$ solution. Chlorosis was controlled for at least 64 days by one soil application of an iron salt of ethylene diamine tetra-acetic acid [see also *H.A.*, 23: 3520].

1924. Guyot, H.
La lutte contre *Cercospora musae* dans les bananeraies de Guadeloupe. (**Control of *Cercospora musae* in Guadeloupe banana plantations.**)
Fruits d'Outre Mer, 1953, **8**: 525-32, illus.

Earlier research by IFAC provided information on the timing of control and on fungicides. In current investigations methods of application such as fogging, low-volume spraying, dusting, etc., are being tested. In fogging experiments carried out in Guadeloupe in the 1952/53 season suspensions of fungicides in oil were used at the rate of 40 l. per ha. on 6-month-old bananas. The formulations were (1) 9 kg. copper oxychloride (at 50% copper), 20 l. AF mobil-oil, 14 l. gas-oil and 6 l. white oil; (2) 4 kg. zineb (zinc ethylene bisdithiocarbamate), 20 l. AF mobil-oil and 20 l. gas-oil. The control plots were sprayed (not fogged) with 0·5% copper oxychloride (plus a wetter) at 1,500 l. per ha. Applications were made fortnightly from January to May 1953 and then weekly up to the date of reporting. Results and conclusions were: (1) the percentages of healthy leaves in the zineb, copper-fogged and copper-sprayed plots were 88, 80 and 29 respectively; (2) thanks to better leaf coloration the zineb plots appeared more vigorous than the copper-fogged plots; (3) the numbers of leaves per 25 plants in the zineb, copper-fogged and copper-sprayed plots were 250, 239 and 246 respectively.

1925. Issa, E.
A "cercosporiose" da bananeira. (**Banana leaf spot disease.**)
Biológico, 1953, **19**: 65-73, bibl. 8, illus.

A review article describing the symptoms and control of leaf spot disease (*Cercospora musae*). In Amazonia *Musa textilis* is regarded as immune, the white and pacovão varieties of *M. sapientum* as resistant, and *M. cavendishii* and other varieties of *M. sapientum* as susceptible while the nanica and nanicao bananas [varieties of *M. sinensis*?] are either susceptible or highly susceptible. It is hoped that on the São Paulo Coast control will be achieved by cutting out severely attacked leaves and that fungicidal treatment will not prove necessary.

1926. Anon.
Corm rot of bananas.
Agric. Gaz. N.S.W., 1953, **64**: 546-7, illus.

Corm rot of bananas, also known as dry stump and root rot, is primarily a disease of "new" plantations and became of greater importance in New South Wales when banana plantings were extended to hardwood forest lands. The disease is rarely encountered in scrub lands (brushwood), but in forest and bastard scrub country up to 300 or 400 stools have at times been lost in a 10-acre plantation. It is due to a number of different fungi which have lived as parasites or saprophytes on green or dead trees. Control is by total eradication and subsequent burning of infected plants including apparently healthy suckers. Replanting in the same hole is undesirable.

1927. Simmonds, N. W., and Simmonds, F. J.
Experiments on the banana borer, *Cosmopolites sordidus*, in Trinidad, B.W.I.
Trop. Agriculture Trin., 1953, **30**: 216-23, bibl. 2.

Three field experiments on the use of traps and one on the application to the soil around banana plants of a mixture of aldrin and dieldrin for the control of the banana borer are described. The traps were made from pseudostems of *Musa balbisiana* and were variously treated with the toxic dust Cosmopolicide-109 (consisting of a dust as carrier for chlordane, parathion and an attractant 2-phenyl-4-hydroxyquinazoline (2P4HQ) in alcohol) or with 2P4HQ alone, alcohol alone or left untreated. The results suggest that the use of aldrin and dieldrin will provide cheaper and more effective control of borers than will traps. Contrary to the experience of Cuillé (*Sér. tech. I.F.A.C.* 4, 1950) it was found that the attractiveness of pseudostem traps was greatest in the first week and thereafter declined. Some responses of the secondary weevil pest *Metamasius hemipterus* to traps are also indicated.

1928. Vilardebo, A.
Étude de l'action de l'H.C.H. sur le bananier. **(A study of the effect of BHC on the banana plant.)**
Merny, G.
Essai sur la phytotoxicité de l'H.C.H. pour le bananier en Guadeloupe. **(Investigation of the phytotoxicity of BHC to the banana plant in Guadeloupe.)**
Cuillé, J.
Les traitements insecticides de la bananeraie contre le charançon du bananier (*Cosmopolites sordidus*). **(Insecticidal treatment of banana plantations against the banana borer, *Cosmopolites sordidus*.)**
Fruits d'Outre Mer, 1953, **8**: 490-6, bibl. 2, 497-9, 499-501.

The experiments in French Guinea and Guadeloupe described in the first 2 papers showed that BHC in the high concentrations necessary for the control of *Cosmopolites sordidus* has little or no effect on the banana plant. The third paper summarizes the results of experiments on the control of the banana borer with BHC that have been conducted in French colonies in recent years. In French Guinea "ordinary" treatment on planting, namely the application of 50 g. 25% BHC (or 100 g. 12%) in a ring round the plant, has given very good results. "Massive" treatment on planting has given good results in the Antilles in areas where infestations are severe and of long standing. It consists of the removal of the outer layer of the sucker containing the eggs and larvae, dusting or dipping in BHC before planting, planting in a hole containing BHC powder and dusting the soil surface after planting. Maintenance treatment consists of one or both of 2 methods, namely (1) spreading 50 g. 25% BHC powder per annum round each plant, and (2) poison baits.

1929. Daudin, J.
Épistillage des régimes de bananes sur pied. **(Removal of dead flower parts from bananas on the plant.)**
Fruits d'Outre Mer, 1953, **8**: 488-9, illus.

The removal of the dead flower parts from bananas before harvesting is an economic proposition and should become normal plantation practice. It should take place between the 8th and 11th day after the appearance of the stem, is a rapid and simple operation performed by hand and presents no disadvantages if done with due care. Fruits treated on the plant have a better appearance than those treated after harvest thanks to the absence of sap stains and to the dry strong scars. The withered flower parts harbour many fungi some of which may be pathogenic.

1930. Queensland (Trout, S. A.).
Horticulture Branch. Bananas.
A.R. Qd Dep. Agric. Stk 1952/53, 1953, pp. 55-6.

Anti-frost bunch covers. Experimental clear and coloured Welvic film plastic covers increased bunch weight, hastened maturity and improved appearance. Red gave the greatest weight increase and blue the greatest acceleration of ripening. *Loss of weight in ripening* is normally about 4·5%. Reductions in weight losses of up to 30% have been obtained with paraffin-base emulsions. As weight loss is related to particle size of the protective covering, experiments are in progress with micro-crystalline waxes which do not affect ripening or quality. *Hormone ripening accelerators.* In small-scale, non-commercial experiments compounds of 2,4-D and 2,4,5-T accelerated softening but not colouring.

1931. Malan, E. F.
Artificial ripening of Cavendish bananas.
Fmg S. Afr., 1953, **28**: 391-2, bibl. 7.

Points discussed include storage and ripening temperatures, humidity during ripening, treatment with ethylene, acetylene or coal gas to accelerate colouring, and the construction of ripening chambers.

Cacao.

(*See also* 2078c, m, w, 2102.)

1932. Cocoa, Chocolate and Confectionery Alliance, Ltd.
Cocoa Conference 1953.
Cocoa, Choc. Confect. Alliance Ltd., London, pp. 148, bibls., illus.

Papers and discussions published in this report largely reflect progress in research and some changes of outlook that occurred in the 2-year period intervening between this conference and its predecessor in 1951. In addition to many papers on which separate abstracts will be found below the following should be noted: "New methods in the processing of cocoa beans in Western Samoa", by D. R. A. Eden [for another account see *H.A.*, 23: 2238]; "The improvement of quality of Nigerian cocoa with reference to purple beans", by A. V. Gibberd; "A discussion of some factors affecting the quality of cocoa produced by Gold Coast farmers", by P. S. Hammond; "Plant breeding at W.A.C.R.I.", by H. H. Rogers and R. Knight; "Flavour of new types of cocoa introduced into West Africa", by R. V. Wadsworth; "The progress of the Gold Coast swollen shoot campaign", by J. D. Broatch; "A review of the swollen shoot disease and the rehabilitation of the cocoa industry of the western region of Nigeria", by R. B. Allnutt; and as appendices: "The cocoa situation

in Bahia (Brazil)", by I. del Tosta Filho; "The need for manuring cocoa in the Gold Coast in order to maintain and augment the level of production", by C. F. Charter; and "Sterility in *Theobroma cacao*", by R. Knight and H. H. Rogers [see *H.A.*, 23: 4581].

1933. Hale, S. L.
World production and consumption—1951 to 1953.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 3-13.

World production of raw cocoa is summarized country by country for the past 12 years and world consumption is discussed for each of the main importing countries. During the crop year 1951/52 production was only 680,000 long tons, during 1952/53 it was estimated to be 735,000 tons. Annual losses due to pests and diseases may well be 200,000 tons. Effective control of these should raise world production to close on 1 million tons, and this would be followed by increased world consumption.

1934. Anon.
Kakaobohnen-Prüfung 1952/53. **(Cocoa bean tests 1952/53.** [German and English texts.] Verlag Gordian-Max Rieck, Hamburg, 1953, 12×8 in., pp. 84, illus., 25s. or $4.00.

The first part of the book gives statistical information on cacao production, exports, imports and price developments for the period 1840–1952/53. In 1952/53, total world production amounted to about 753,000 long tons, to which Africa contributed 67%, America 32% and Asia and Oceania 1%. Of individual territories the Gold Coast is the largest producer with 248,000 tons, followed by Nigeria and Brazil with about 110,000 tons each. The percentages of large, medium-sized, small and defective beans in the samples of all exporting countries are tabulated for 1938 and 1953. In the second part each of the 24 major cacao growing territories has been allotted 2 pages in which are presented statistical material, clear photographic illustrations of bean samples and a map showing the location of the industry.

1935. Rivera H, R.
Anotaciones sobre el cultivo del cacao en Antioquía. **(Notes on the cultivation of cacao in Antioquía.)**
Bol. agric. Soc. Antioq. Agric., 1953, **392**: 3757-61; **393**: 3815-25, from abstr. in *Turrialba*, 1953, **3**, No. 166/53.

Cacao cultivation in Antioquía is expanding. Experiments on vegetative propagation, clonal reproduction, shade practice and disease control are described.

1936. Moss, A. E.
The age of Gold Coast cocoa trees and long-term production prospects.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 88-91, maps.

In the course of the swollen shoot campaign about 2,750,000 acres of cacao have been surveyed. The ages of trees determined in about 1,700,000 acres were found to be: up to 7 years old 13%, 8–15 years old 14%, 16–30 years old 42%, and over 30 years old 30%. A cautious estimate suggests that, assuming effective swollen-shoot control is achieved, production may rise gradually during the next 15 years but is unlikely to reach 300,000 tons per annum.

1937. Allen, E. F.
Investigations into the cultivation of cacao in Malaya.
Malay. agric. J., 1953, **36**: 147-63, bibl. 6, illus.
Voelcker, O. J.
A progress report on cocoa in Malaya.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. and Confect. Alliance, Ltd., pp. 14-16.

In the first paper progress is reported on establishment and spacing trials with cacao as a pure crop, variety trials, intercropping experiments and manurial trials. The second paper covers some of the same ground, though in less detail. *Establishment as a pure crop.* Where cacao is planted on old land, cultivated shade has proved essential and various trees and plants that appear to be satisfactory or have proved unsatisfactory for the purpose are indicated. In secondary forest the existing flora may give some guidance on the suitability of the area for cacao; owing to root competition in such areas cacao requires adequate manuring. In virgin jungle judicious thinning or felling followed by rapid secondary regrowth have provided conditions suitable for the establishment of cacao. *Variety trials.* The various introductions made to Malaya are listed; of these only West African Amelonado can be used at once for commercial planting. *Intercropping trials.* Cacao has been interplanted with rubber, coconuts, oil palms and Manila hemp. Attempts to establish cacao through old rubber have in nearly every case failed, but some trials with young rubber and old coconuts show promise. There is insufficient evidence concerning behaviour in the other crops. *Manurial trials.* Two trials are in progress. Girth measurements taken at 14 months showed a significant response to P, but it is too early to draw conclusions from this.

1938. Vallaeys, G.
A brief survey of the investigations carried out by I.N.E.A.C. in the Belgian Congo.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 140-4, bibl. 7.

Following a short account of the conditions under which cacao is grown in the Belgian Congo work in progress at Yangambi and elsewhere is briefly discussed in relation to the selection of Amelonado material, soil studies, manuring, types and management of shade, mixed cultivations of cacao and hevea and of cacao and oil palms, spacing and training (single and double jorquettes and free growth).

1939. The Imperial College of Tropical Agriculture.
A Report on Cacao Research 1952.
Imperial College of Tropical Agriculture, St. Augustine, Trinidad, and 40 Norfolk Street, London, W.C.2, 1953, 10½×8½ in., pp. 71, bibls., illus., 8s.

This is a successor to the 1945/51 research report [see *H.A.*, 23: 1024]. Most of the papers which it contains are abstracted below. Those not abstracted are: The botanical programme, 1952, by R. E. D. Baker; Plant breeding—a progress report, by F. W. Cope; The chemical programme, 1952, by F. Hardy; Notes on soil investigations in progress, by G. Havord; Cacao soil

fertility and the effect of mulching, by T. Wasowicz; Plant pathology, a progress report, by W. T. Dale.

1940. Anon.
Cacao research program of the Inter-American Cacao Center.
Cacao, 1953, **2** (45/46): pp. 1-4.

An outline is given of the cacao research programme now in progress at Turrialba, of which the main features are as follows: *Physiological and ecological studies:* water relations, shade, mineral nutrition, data on growth, flowering and fruiting, and hormones in relation to fruit set. *Propagation:* by cuttings, grafting and budding, types of propagator, and storage of budwood. *Cultural methods:* Field trials include shade and manuring effects and interactions, and pruning. *Rehabilitation of old plantations* by pruning and budding basal chupons. *Phytophthora pod rot:* Disease development, resistance, and control with copper and non-copper fungicides. *Collection and cataloguing of clones*, local and introduced.

1941. Cope, F. W.
The Anglo-Colombian cocoa-collecting expedition.
J. agric. Soc. Trin. Tob., 1953, **53**: 255-60.
Baker, R. E. D.
Anglo-Colombian cacao-collecting expedition.
Rep. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 8-10.
Cope, F. W.
An interim report on the Anglo-Colombian cocoa-collecting expedition.
Rep. Cocoa Conf. Lond. 1953, Cocoa Choc. Confect. Alliance, Ltd., pp. 57-64.

The first paper gives a popular introductory account. The second outlines the history of the expedition to the end of 1952 and gives notes on the various species of *Theobroma* and *Herrania* encountered, their native names and the presence or absence of witches' broom disease (*Marasmius perniciosus*). The third paper gives further details and carries the story to July 1953, listing the seed material despatched and established in Trinidad.

1942. Rosenquist, E. A., and Sockalingam, T.
Amelonado cacao in Malaya.
Malay. agric. J., 1953, **36**: 164-80, bibl. 7, illus.

Amelonado cacao was introduced into Malaya in November 1949, and its subsequent behaviour in variety trials in comparison with open pollinated and legitimate Trinitario cacao is recorded. Vigour and early yields of Amelonado seedlings have been satisfactory, and their pods, containing an average of 112 g. wet cacao, remarkedly uniform. Experience gained in establishing seed gardens is outlined.

1943. van der Knaap, W. P.
Algemene beschouwingen over de factoren, welke van invloed zijn op de productiecapaciteit van cacaoclonen. **(Factors which influence the yield capacity of cacao clones.)** [English summary 11 lines.]
Arch. Koffiecult., 1953, **17**: 121-40, bibl. 16, illus.

In a trial with seedlings from 3 clones, a significant positive correlation was found to exist between pod production and tree girth. The criterion for mother tree selection should therefore be the ratio pod production/tree girth in relation to the same ratio for the whole plantation. An examination of pods from clonal cacao showed that the number of beans per pod and the total bean weight were positively correlated. Selection based on bean weight is therefore bound to result in clones with a high bean weight per pod.

1944. van der Knaap, W. P.
Overzicht van de selectiewerkzaamheden ten behoeve van de cacaocultuur. **(A review of selection work with cacao.)** [English summary ½ p.]
Arch. Koffiecult., 1953, **17**: 141-63, bibl. 5.

Some general problems concerning the breeding of cacao clones and seedling families and the statistical design of clonal and seedling trials are discussed. The clones DR 1, DR 2 and DR 38 have a potential yield of 1,000–1,500 kg. dry cacao per hectare. The seedling families of the same clones will yield 700–900 kg. dry cacao per ha. The characters of 16 second or third generation mother trees of the DR type are given. The highest yielder gave more than 20 kg. dry cacao in 1951. The programme for breeding work in the future is discussed. [From author's summary.]—C.P.V. Res. Stat., Java.

1945. Harris, R. J.
Vegetative propagation of cacao from greenwood cuttings at the Lowland Agricultural Experiment Station, Keravat.
Papua New Guinea agric. Gaz., 1953, **8**: 7-18, bibl. 8, illus.

A method of propagating multi-leafed cacao cuttings from terminal green wood in cheap, glass-lidded wooden boxes is described. Best light intensity for rooting was found to be 40–50 candlepower per sq. ft. The best rooting medium was sawdust treated with a solution of potassium indole butyrate plus potassium naphthalene acetate [details not given]. This gave 75–100% strike and the roots, in clusters of 6–11, were 3·5–4·0 in. long after 4 weeks. Rooted cuttings are hardened in a solar or home made propagator for 2 weeks after removal from the rooting box and then placed out under weak light (20–25%) for 2 months before planting out.

1946. Cope, F. W., and Murray, D. B.
A stock scion experiment with cacao. Progress report.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 34-5, bibl. 3.

An experiment was laid down in September 1951 to obtain information on the interactions as stocks and scions of 4 clones, ICS 1, 45, 60 and 95, using each as stock and scion in all possible combinations. ICS 1 is a high yielding clone only under good conditions, ICS 45 a rather delicate Criollo type, ICS 60 a vigorous Criollo and ICS 95 a hardy Forastero which does well under poor conditions. Differences in growth at the end of the first year are given.

1947. Homès, M. V., and others.
L'alimentation minérale du cacaoyer. **(Mineral nutrition of cacao.)**
Publ. Sér. sci. I.N.E.A.C. **58**, 1953, pp. 128, illus., 125 fr.

Part I (pp. 16) is concerned with the principles of experimentation in plant nutrition, Part II (pp. 52) with the growth and development of the cacao tree in relation to nutrient medium, Part III (pp. 45) with its mineral composition in relation to nutrient medium, and Part IV (pp. 15) with general considerations and conclusions. Nine different combinations of the chemical equivalents (defined as weight of ion divided by its valency) NO_3, $\frac{1}{2}SO_4$, $\frac{1}{3}PO_4$, K, $\frac{1}{2}$Ca and $\frac{1}{2}$Mg were applied to cacao seedlings in pot experiments at Yangambi. The effect of the treatments on height, root growth and health, and the results of leaf and stem analyses are discussed at length. Four standard fertilizer formulations, each containing the 6 ions, are tentatively recommended for use in different circumstances as indicated by leaf analysis. These comprise a balanced fertilizer, a high Ca/high Mg/low K fertilizer, a high Mg/low K fertilizer and a high Mg/high NO_3/low K fertilizer.

1948. Havord, G.
Manurial and cultural experiments on cacao (River Estate, Trinidad). Part II.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 44-6, bibl. 5.

Seven experiments were described in the last report. [See *H.A.*, 24: 864.] An account is now given of 5 further experiments recently initiated or planned, namely (8) Trenching: to give more information on the effect of the trenching system used in Experiment (3); (9) Cultivation: no cultivation *vs.* cambered beds *vs.* flat cultivation, and NPK *vs.* no-NPK; (10) Root growth: good clone (ICS 95), poor clone (ICS 62) and grafts of ICS 95 on ICS 62 rootstock raised from cuttings; (11) Trace elements: involving 3 soil acidity treatments and 5 methods of applying trace elements; (12) Additional shade: clonal cuttings and clonal seedlings at wide and close spacing with and without permanent shade.

1949. Murray, D. B.
A shade and fertilizer experiment with cacao. Progress report (continued).
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 11-21, bibl. 14, illus.

The description is continued of a shade experiment with young cacao in which five light intensities varying from 100% to 15% of full sunlight are combined with eight manurial treatments on three clones. During their second year in the field a few trees came into bearing. Most pods were produced at a light intensity of 50% of full light followed by 25, 15 and 75% in that order. Plants growing in full light gave no yields. Some of the gross morphological effects of light intensity are described including the effect on average fresh leaf weight, ratio of dry weight/fresh weight of leaf and stomatal density. Leaf analyses have shown that light intensity markedly affects mineral levels in the leaf. The over-all effect of shade is to increase levels of N and K in the leaf. Similar levels to shaded plants can be produced in unshaded plants by fertilizer applications. Shade, therefore, is the equivalent of additional dressings of N and K but additional fertilizers alone do not completely compensate for the absence of shade when the plant is young. Marked gradients in levels of N, P and K occur between young and old leaves. Leaves in full light have a much shorter life on the tree than leaves on plants grown in shade. Shade slows down the metabolism of the leaf. As the plant grows in size the effect of self-shading becomes important so that although in the first year or two the best growth is made at about 50% light intensity, when the plants start to form a closed canopy a higher light intensity produces better growth. It is suggested that for fully mature cacao shade acts as a buffer against unfavourable conditions. In a well-drained fertile soil with no very severe dry season cacao will give high yields without shade. Under rather less favourable conditions shade may act as a buffer against too rapid changes in mineral levels and water relations and thereby maintain a better average condition of tree. The effect of shade on cacao in respect to mineral nutrition is compared with the effect on coffee and tea. There is general agreement on the effect of shade in maintaining higher mineral levels in the leaves of these three tropical crops. [Author's summary—see also *H.A.*, 22: 3039 and 24: 866.]

1950. Fennah, R. G.
The collection of leaf samples of cacao for assessment of the nutrient status of the tree.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 36-40, bibl. 4.

The principal methods which have been used in collecting leaf material from cacao trees for determining their nutrient status by analysis are reviewed. A method of sampling is described which supplies information on the nutrient status of the leaf, its changes during growth, and rate of growth. [From author's summary.]

1951. Evans, H., and Murray, D. B.
The application of rapid chemical tissue tests to the determination of mineral levels in cacao.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 27-31, bibl. 13.

The diagnosis of mineral malnutrition in cacao can now be made by three methods: (1) visual diagnosis from the symptoms on growth in sand and water culture and in the field; (2) by interveinal injections, with certain exceptions notably potassium; and (3) rapid tissue tests, as here described, for nitrate-nitrogen, phosphate, potassium, magnesium, calcium, manganese, aluminium, chloride, sulphate, iron, copper, zinc (provisional), boron and molybdenum. The rapid tissue tests have been found of great value at deficiency and toxicity levels though they are not sufficiently sensitive for differences within the normal range. In healthy cacao leaves a wide range of nutrient levels is not found, relatively small changes in balance of the macronutrients leading to early leaf senescence. The general balance of minerals as obtained from the tests is therefore of greater value than the actual level of one mineral accurately determined. Thus high levels of magnesium and calcium are associated with deficiency of potassium and *vice versa*, high phosphate levels are found with nitrogen deficiency, etc. Further work is necessary on the mineral balance and interactions. The position is complicated by the effect of light intensity on this balance. [From authors' discussion—see also *H.A.*, 24: 867.]

1952. MURRAY, D. B.
The treatment of iron chlorosis with the iron complex of ethylene diamine tetra acetic acid.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 32-3, bibl. 3, illus.

Ferrous sulphate at 2 g., Fe EDTA at 1 g. and 5 g. and calcium carbonate with and without Fe EDTA were applied to very chlorotic, basket-grown cacao seedlings. Fe EDTA alone (Ferrosene containing 8% iron chelate as metal) corrected the iron deficiency; the 5 g. level killed one seedling and completely defoliated the other but the new flush carried much larger leaves entirely free from chlorosis, while some chlorosis persisted with the 1 g. level after 6 weeks. Calcium carbonate plus 5 g. Fe EDTA caused some improvement, but neither ferrous sulphate nor calcium carbonate alone gave any response.

1953. RODRIGUES, G.
A further study of marginal leaf scorch of cacao.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 47-51.

Analyses of cacao leaves affected by marginal leaf scorch show that, by comparison with normal leaves, they contain increased amounts of ash, Ca, Mg, Na and Cl and reduced amounts of N, P and K. A scorched leaf is clearly a prematurely senescent leaf. The results throw some doubt on the theory that chloride toxicity may be responsible for scorching.

1954. MURRAY, D. B.
The effect of mineral injections and hormone sprays on flower setting and fruit development in cacao. I.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 22-6, bibl. 10, illus.

Competition for water and minerals and low hormone levels have been put forward as the two conditions responsible for cherelle wilt. In experiments the use of hormone flower-sprays (alpha naphthaleneacetic acid and 2,4,5-trichlorophenoxyacetic acid) resulted in better fruit set by increasing the length of time flowers remained on the tree, but did not increase crop through reducing cherelle wilt. Injection of additional nutrients, including a complete nutrient solution, did not increase final crop or reduce cherelle wilt. However, in a later experiment [not described] there was response to a complete nutrient injection.

1955. PEIRIS, J. W. L.
A virus disease of cacao in Ceylon.
Trop. Agriculturist, 1953, **109**: 135-8, bibl. 5, illus.

The presence of a mild strain of virus in Ceylon cacao is presumed from the occurrence of vein clearing symptoms similar to those caused by virus in Trinidad. The formation of rounded pods was observed on some, but not all, affected trees. No swellings have been found on stems or roots. Investigations continue.

1956. NICOL, J.
Progress of research on systemic insecticides at W.A.C.R.I.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 98-104, bibl. 4.

Among various systemic insecticides so far tested hanane and others containing dimefox (bis-dimethylamino fluorophosphine oxide) remain the most satisfactory. Studies are reported on the inactivation of dimefox in soil and on its action on mealy bugs on pods. Infective mealy bugs transmitted virus to healthy plants that had been treated 49 hours earlier with hanane. Analysis of beans from pods harvested 6 weeks after treatment of the trees showed that in no case did hanane residues exceed 0·1 p.p.m. In tests of a new "implantation" method which involved placing a 50% solution of dimefox around the base of the tree it was shown that a dose of 250 p.p.m. of the tree weight could be expected to reduce mealy bugs to an average of about 1 per tree. In the course of the discussion it was pointed out that tests made by the Cocoa Scientific Advisory Committee had revealed off-flavours in beans from hanane-treated trees. Doubts were also expressed on the subject of toxicity to mammals although tests by the Toxicological Research Unit, Medical Research Council, had failed to reveal the presence of a toxin in beans from treated trees.

1957. MIRANDA, S., AND DA CRUZ, H. M.
Fighting brown pod rot disease in Bahia.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 120-2.

Work since 1938 on the control of pod rot of cacao due to *Phytophthora palmivora* at the Bahia Cacao Institute in Uruçuca is summarized without experimental data. It has been found that the incidence of the disease is greatest when mean minimum temperatures fall below 20° C. during times when the R.H. exceeds 85%. A highly resistant clone SIC 28 is being multiplied. In a spraying trial 1% bordeaux mixture gave slightly better results than other concentrations of bordeaux. In further trials with 12 fungicides cuprosan gave promising results. A campaign has been organized for the commercial control of black pod, and also for the control of the enxerto ant, *Azteca paraensis* var. *bondari*, for which BHC has proved very effective.

1958. ORELLANA, R. G.
Studies on *Phytophthora* pod rot of cocoa in Costa Rica.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 117-20, bibl. 8.

Pod losses due to black pod in unsprayed cacao at La Lola, Costa Rica, between January and June 1953, averaged 47%. Studies are in progress on infection and development, resistance, and control by fungicides. There is evidence of distinct differences in susceptibility between clones, and some indication that purple fruited types may be more susceptible than green. Several fungicides are being compared with bordeaux mixture in screening and field trials, but none has yet proved superior. An increase in yield following applications of dithane Z-78 may have been due to the action of zinc in the fungicide; independent trials showed a yield response to zinc at La Lola.

1959. RENAUD, R.
Observations sur les pourritures des cabosses de cacaoyer. **(Notes on cocoa pod rots.)**
Bull. Centr. Rech. Agron. Bingerville, 1953, **7**: 3-19, from abstr. in *Trop. Abstr.*, 1953, **8**, No. 2866.

Preliminary investigations are reported on the control of black-pod disease of cocoa in the Ivory Coast. Collection of infected pods must be carried out at the

right moment. Bordeaux mixture only remains fully efficacious over a period of two months—after 4 or 5 months it loses its effectiveness altogether. Spraying should not be carried out during flowering or fruit formation. The right time and method of spraying still need investigation.

1960. THOROLD, C. A.
The control of black pod disease of cocoa in the western region of Nigeria.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 108-15, bibl. 19, illus.

There is evidence from inoculation trials that variations in pod infection by *Phytophthora palmivora* may be attributed in part to differences in host susceptibility, but information is at present lacking on any physiological or morphological differences which might provide a basis for the selection of resistant material. A survey has revealed a tendency for the number of black pods per tree to vary directly with the total number of pods per tree. A statistical procedure applied to this relationship has proved illuminating and has provided the means of estimating the extent of infection in a given area from a limited number of observations. It also helps to explain certain anomalies in the relationship between rainfall and black pod incidence; although high rainfall encourages infection it may also depress total pod numbers. The results are given of experiments in control (1) by removing diseased pods, and (2) by spraying with 1% carbide bordeaux [see also *H.A.*, 23: 4584]. Costs are tabulated from which it is shown that the first method used alone is uneconomic. Control by spraying has proved practicable and is likely to be economic on an extended scale. The programme of treatment should, however, be varied in relation to both pod yield and rainfall conditions in each area.

1961. BAKER, R. E. D.
Black pod disease in Trinidad.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 115-16.

Recent studies in Trinidad indicate that black pod (*Phytophthora palmivora*) is usually serious only in the wetter areas, that the occurrence of the disease is seasonal, being slight in dry weather when most of the crop matures, and that infection is largely confined to the older pods.

1962. WILLIAMS, G.
Field observations on the cacao mirids, *Sahlbergella singularis* Hagl. and *Distantiella theobroma* (Dist.), in the Gold Coast. Part II. Geographical and habitat distribution.
Bull. ent. Res., 1953, **44**: 427-37, bibl. 7.

The geographical ranges of *Sahlbergella singularis* and *Distantiella theobroma* overlap, and the Gold Coast lies in the zone common to both. [For an abstract of Part I dealing with mirid damage see *H.A.*, 24: 879.]

1963. DE BELLEFROID, V.
The problems of regeneration after severe capsid damage.
Rep. Cocoa Conf. Lond. 1953, Cocoa, Choc. Confect. Alliance, Ltd., pp. 104-6, illus.

Capsid bugs, *Sahlbergella singularis*, have been successfully controlled in the Belgian Congo by applying Nioka dust (gammexane [BHC]) with a Mistral hand bellows. The average monthly consumption of dust is equivalent to 1 lb. for nearly 3 acres and the resultant yield increase is estimated to be 30%. Severely damaged trees can be regenerated by allowing suckers to develop, but the problem of making these jorquette at a reasonable height remains unsolved. A list of forest trees that are considered unsatisfactory as shade for cacao is appended.

1964. KIRKPATRICK, T. W.
Notes on minor insect pests of cacao in Trinidad.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 62-71, bibl. 14.

Studies are in progress on the minor pests of cacao, and it is hoped to publish accounts of them in this series of Annual Reports. The present report deals in some detail with the mealy bugs and allied Coccidae found on cacao and with their predators and parasites.

1965. KEMPF, N. W.
Factors affecting the quality of cocoa beans.
Rep. Cocoa Conf. Lond. 1953, Cocoa Choc. Confect. Alliance, Ltd., pp. 24-9.

The controllable factors in the tropical processing of cacao are discussed with particular reference to harvesting practice, sanitation in opening pods and handling beans prior to fermentation, temperature reached during fermentation, the effect of incomplete fermentation on time needed for drying, proper drying practices, and storage prior to shipment.

1966. FORSYTH, W. G. C.
Purple beans.
Rep. Cocoa Conf. Lond. 1953, Cocoa Choc. Confect. Alliance, Ltd., pp. 32-4, bibl. 8.

This paper is divided into 2 parts: (1) a précis of recent investigations carried out at the Colonial Microbiological Research Institute, Trinidad [see also *H.A.*, 22: 4328 and 23: 1257, 1258 and 3531], and (2) a discussion on the destruction of the purple pigments of the cacao bean during curing. When Trinidad cacao beans are fermented for 5 to 6 days in such a manner that the temperature reaches at least 44° C. by the 2nd to 3rd day practically complete destruction of purple pigments should occur. One of the two anthocyanin pigments responsible for purple colour is destroyed rapidly and the other much more slowly. Most of the destruction is enzymic, and the slowness of the reaction suggests that the enzyme may be present only in trace amounts. The possibility that West African cacao contains even smaller amounts of the enzyme than Trinidad cacao merits investigation.

1967. MACLEAN, J. A. R., AND WICKENS, R.
The present position of research at W.A.C.R.I. on the preparation of cocoa and the assessment of quality of the product.
Rep. Cocoa Conf. Lond. 1953, Cocoa Choc. Confect. Alliance, Ltd., pp. 34-9, bibl. 7.

Some improvement has been made in the micro-fermentation technique described earlier [*H.A.*, 21: 2023 and 22: 1902]. The use of dextrose in place of

pulp starter or with pulp starter made no difference to the percentage of fully fermented beans obtained, which was over 90% in all cases. Three intermediate-scale fermentation methods have been studied, namely the basket method giving a purple bean percentage of about 45, the solar fermentary giving about 60% purple beans, and the open-mesh bag method with the bag placed on the top and not in the centre of the sweat box, which has yielded 25% to 40% purple beans. In bulk fermentation trials earlier findings that beans from under-ripe pods produce higher purple bean counts than those from ripe pods have been confirmed. Storage trials have shown that there is a marked decrease in the percentage of purple beans over a period of 36 weeks. Methods of quality assessment are discussed and a procedure outlined which appears to make possible a reasonably accurate assessment of West African cacao.

1968. DE WITT, K. W.
Studies in the small scale fermentation of cacao: (II) The conditions of fermentation.
A.R. Cacao Res. imp. Coll. trop. Agric. 1952, 1953, pp. 56-9, bibl. 7, illus.

Three main phases are distinguishable in cacao fermentation: I. anaerobic, in which the temperature rises to 48–50° C. and the bean dies, turns pale or slatey, and "plumps"; II. aerobic, in which polyphenolic materials are oxidized and the bean turns brown; and III. drying, which inhibits oxidation and stabilizes the colour. It is suggested that the major factors operative in determining the course of fermentation are temperature and moisture content of the cacao; the critical nature of these factors is discussed. Conclusions drawn as to the causes of defects in fermented cacao are: (1) astringent, bitter, unplumped, hard, purple-brown beans with shell not detached—phase I inhibited due to drying-out in the early stage of fermentation; (2) astringent purple or slatey beans of cheesy cut—phase II inhibited due to drying-out at later stages; (3) hard, flattened, astringent, bitter, slatey purple beans—phases I and II inhibited due to drying-out at later stages; (4) as above, perhaps with signs of germination—phases I and II inhibited due to low temperature; and (5) dull break, dark testa and cotyledons, brittle shell—phase III inhibited due to wet weather during drying period. The results given involve no departure from the best current practice. [For Part I see *H.A.*, 24: 881.]

1969. DE WITT, K. W.
The visual assessment of cured cacao.
Trop. Agriculture Trin., 1953, **30**: 228-36, bibl. 9.

The characteristics affecting the value of fermented cacao, are described, and their determining factors discussed. A scheme is suggested for the examination of cacao for advisory purposes. [Author's summary.]

Cloves.

1970. NUTMAN, F. J.
Note on the relationship between climatic factors and transpiration and assimilation of *Eugenia aromatica*.
Ann. Bot. Lond., 1953, **17**: 611-14, bibl. 5.

Records obtained on an 8-year-old clove tree showed that fluctuations in transpiration rate are closely related to radiation and not to changes in the evaporating power of the air. Whereas with coffee the transpiration rate showed a marked mid-day drop associated with stomatal closure [see *H.A.*, 11: 560], with the clove tree no similar mid-day drop in transpiration has been observed. From measurements of assimilation rates of single horizontal leaves it seems probable that the explanation lies in the dense bushy habit of the tree, which means that a high proportion of leaves are in shade at mid-day. The high transpiration rates of these might compensate for reduced transpiration associated with stomatal closure of the exposed leaves.

Coconuts.

(*See also* 1077, 2078j, 2100.)

1971. SAYEED, P. M., AND NARAYANA, G. V.
Scheme of research on coconuts in Madras State. Final report on the work done during the period of the scheme from 15th September, 1943, to 31st March, 1952.
Indian Coconut J., 1953, **6**: 102-25.

The results are given of 3 research projects. (1) *The performance of palms obtained from various yield groups by self-, natural and cross-pollination.* Low-yielding parents, especially those giving 40 nuts or less per tree per annum gave poor quality progenies. Selfing as a method of crop improvement was not found useful. High-yielding parents produced vigorous progenies. (2) *Button shedding.* Observation of indigenous and exotic palms showed that the sequence of shedding among exotic varieties is more or less similar to that in the ordinary tall variety of the west coast, that most shedding (up to 99%) occurs within 6 weeks of the stigmas becoming receptive, that in the tall west coast variety about a third of the buttons shed have all 3, or 2, cells distinct while in the rest only 1 cell is developed, that the number of shed buttons showing insect or disease attack is negligible, and that maximum shedding occurs in rainy and hot months and the minimum during cold months. (3) *Suitability of husks from nuts at different stages of maturity for the manufacture of coir fibre.* The best ages were 10–12 months old.

1972. SALGADO, M. L. M., AND NETHSINGHE, D. A.
Preliminary observations on transformation of soil nitrogen under coconuts.
Trop. Agriculturist, 1953, **109**: 111-17, bibl. 11.

A series of analyses of soils from a coconut grove showed surprisingly high ammonia-nitrogen contents and very low nitrate-nitrogen contents. The authors speculate whether the coconut palm is able to absorb part of its N in the form of ammonia, and suggest the need for more detailed studies.

1973. DWYER, R. E. P.
Diseases of coconuts (*Cocos nucifera*) in Papua and New Guinea.
Papua New Guinea agric. Gaz., 1953, **8**: 24-40, bibl. 88.

A list is given of all the coconut diseases recorded in Papua and New Guinea, namely bud rot, root rots, diseases of the stem, leaf and nut, physiological dis-

orders and suspected virus diseases. Bud rots, including true and false bud rot, sporadic bud rot and tapering stem, are discussed at length.

1974. DE LEON, D., AND BIGORNIA, A. E.
Coconut kadang-kadang disease in the Philippines and experimental control program.
[*Mimeo. Publ.*] *U.S. Mutual Security Agency spec. tech. econ. Mission, Manila*, 1953, pp. 17.

Kadang-kadang is the most serious plant disease in the Philippines. Nut production ceases about a year after symptoms first appear and infected palms do not recover. The leaf symptoms are mottling, yellowing and stunting; the fruit symptoms are desiccation of the husk and reduction in size. The cause of the disease is being investigated. Experimental control by tree felling gave no results, but spraying with insecticides showed promise. Other studies are concerned with rate of spread and intensity and early diagnosis.

1975. VESEY-FITZGERALD, D.
Review of the biological control of coccids on coconut palms in the Seychelles.
Bull. ent. Res., 1953, **44**: 405-13, bibl. 2.

Scale insects recorded as feeding on coconuts in the Seychelles are listed. An epidemic reached its peak during 1932–1937. Following the introduction of coccinellid predators in 1941 annual coconut production in the Seychelles rose from about 36,600,000 nuts in the period 1932–36 to 42,700,000 nuts in the period 1942–46 and to 49,000,000 nuts in 1947–51. The coccids and their predators have now reached a balanced economy which should act as an insurance against any coconut-feeding scale establishing itself in the colony as a major pest.

1976. DUN, G. S.
Plantation hygiene and rhinoceros beetle (*Oryctes rhinoceros*).
Papua New Guinea agric. Gaz., 1953, **8**: 48-51.

The following are egg-laying foci and should be eliminated: dying and dead coconut and other palms, refuse heaps and vegetable rubbish, sawmill waste, rice husks and banana stools, rotting logs and forest detritus. The use of log traps for adults and the regular collection of adults among young palms are recommended.

1977. ANON.
Simple, direct extraction of coconut oil.
Food Engng, 1952, **24** (10): 143, 145, from abstr. in *Abstr. curr. sci. tech. Lit.*, 1954, **7**, No. 166.

The intractable protein envelope enclosing the oil globule in the fresh nut meat is broken by carefully controlled enzyme action followed by rupturing the envelope by chilling. The oil is removed by centrifuging and is ready for storage after filtering. Refining is unnecessary and there are no losses through chemical deterioration. Over-all recovery in terms of fresh nut meat is reported to be 10% higher than for copra. Operating details are given for a pilot plant in the Philippines producing up to 5 tons of oil a day.

Coffee.

(*See also* 1077, 2078g, o, r, x, 2079d.)

1978, MARTINEZ, A., AND NOËL JAMES, C.
Café: bibliografía de las publicaciones que se encuentran en la Biblioteca del Instituto.
(Coffee: bibliography of publications in the [Interamerican] Institute library.)
List. bibl. Inst. interamer. Cién. agric. **1**, 1953, pp. 226.

This bibliography of the coffee publications to be found in the Orton Commemorative Library at the Interamerican Institute of Agricultural Sciences, Turrialba, Costa Rica, contains 1,840 references. It is divided into 6 parts, namely the *coffee tree* (288 references): taxonomy and varieties, morphology and physiology, selection and breeding; *coffee growing* (239): general, Central America together with Mexico and the Caribbean (54), South America (38), Africa (17) [this section does not include any Belgian publication on coffee growing in the Belgian Congo], Asia and Oceania [the Netherlands East Indies are represented by 5 publications only, 3 of them in Spanish periodicals]; *cultural practices* (593): general, propagation, pruning, shading, soils and manuring, soil conservation, rehabilitation of plantations, and yield; *diseases and pests* (507): general, diseases (234), pests including nematodes (253); *processing* (140); and research including annual reports (69). There is an author index.

1979. JONES, P. A.
The management of coffee nurseries in Kenya.
Mon. Bull. Coffee Bd Kenya, 1953, **18**: 566-9, illus.

Seed preparation, site selection, seed bed preparation, sowing, transfer to seedling beds, shading, diseases and pests.

1980. TANGANYIKA (SANDERS, F. R.).
Eighteenth Annual Report of the Coffee Research and Experimental Station, Lyamungu Moshi, 1951, 1954, pp. 39, 2s.

An advance copy of this report was abstracted in *H.A.*, 23: 3545. Additional information is now given on experiments in vegetative propagation. In an experiment to compare 4 types of stem cutting of *Coffea arabica*, normal entire softwood cuttings gave 98% strike, central single-node cuttings (soft at base) 83·5%, soft tips (2 pairs of leaves) 81% and basal single-node cuttings (semi-hard at base) 61%. In another experiment alpha-naphthaleneacetic acid at 250, 500 and 1,000 p.p.m. did not significantly increase the percentage of rooting (mean 93%) but hastened rooting (mean 13·5 and 15·0 weeks in clones N29 and N71 respectively compared with 14·6 and 17·6 in the controls), and increased the number of roots per cutting (mean 4·7 and 5·01 in N29 and N71 respectively compared with 4·58 and 4·85).

1981. GUINARD, A.
Caféiers. **(Coffee.)**
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 131-46, illus.

This report includes an account of experiments on the propagation of arabica watersprout cuttings. Subjects of study included rooting media, length of cuttings,

condition of leaves left on cuttings, use of vitrex frames, comparison of softwood and semi-hardwood cuttings, watering, and soaking in water for 24 hours before planting. Recommendations are for the use of softwood cuttings with 2 internodes, the top pair of leaves being left intact and the cuttings set in red soil shaded from the sun and given 1 mm. water daily. The cuttings should be taken at the beginning of the rains.

1982. Carré, J.
Greffage du caféier à la machine. (**Mechanical grafting of coffee.**)
Agron. trop., 1953, **8**: 506-7, illus.

An instrument which grafts material up to 21 mm. in diameter by the whip-and-tongue method was tested at Ivoloina Station, Madagascar. A team of 2 men could do 45 field-grafts an hour. Percentage success in favourable weather averaged 80 for congensis on robusta, 54 for arabica on robusta and 70 for robusta on robusta. Small bench-grafting experiments with stumped rootstocks gave 50–60% success. Mechanical grafting of *Aleurites montana* gave 100% success.

1983. Pablo Duque, J.
Importancia de una poda racional en el cafeto cultivado bajo sombra. (**The importance of rational pruning in shade-grown coffee.**)
Suelo Tico, 1953, **7** (29): 48-57.

Especially when closely planted, shade-grown coffee is much less productive than sun-grown coffee and after a few good yields in early life growth becomes slow and production falls. The author recommends a "rational" system of pruning based on the growth habits of the coffee tree and involving the removal of old wood to stimulate new growth. Rational pruning consists of 2 operations, substitution pruning which takes place immediately after harvest and is designed to favour the branches that will produce next year's harvest, and selection pruning which occurs later in the year and favours branches that will produce the next harvest but one.

1984. Beaumont, J. H.
Coffee production in Kona, Hawaii.
Hawaii Fm Sci., 1954, **2** (3): 2-3, 8, illus.

There is an urgent need to reduce coffee production costs in Hawaii. In an experiment on multiple-stem coffee spaced 12×12 ft. heavy pruning in which one of the 3 or 4 vertical stems was cut back each year resulted in a yield of 105 bags cherry per acre compared with 136 bags from lightly pruned coffee, but made picking much easier. Hard pruning should also make closer spacing possible and thus offset the reduced yield per tree. Experiments are now in progress on closer spacing and on the pollarding of entire trees every fourth year.

1985. Alvim, P. de T.
Algunos estudios sobre la fisiología del cafeto. (**Some physiological studies on coffee.**)
Suelo Tico, 1953, **7** (29): 58-62, bibl. 19.

Physiological studies on coffee seedlings were carried out at Turrialba in 1952/53 in light intensities of 100, 60, 45 and 30%. With increasing light, the net assimilation rate and the relative intensity of growth increased and the leaf area index fell slightly, giving a curve typical of a sun-loving plant. In general the response of coffee to light was much more characteristic of a sun-loving than a shade-loving plant. With increase in light intensity the number of leaves increased (but independently of branching) though the total leaf area diminished. The minimum light intensity required for the survival of the coffee plant was found to be 7·2%. In a nutritional study laboratory and field tests showed that the chief cause of the disorder known as "café macho" which occurs on acid soils (pH 4·5–5·0) is excess of manganese.

1986. Trojer, H.
Distribución horizontal de luminosidad en un cafetal y en almacigos. (**Horizontal distribution of light in a coffee plantation and in nurseries.**)
Bol. inf. Colombia, 1953, **4** (45): 20-32.

In studies at El Naranjal and Cinchina the light intensity under various types of natural shade in a coffee plantation, expressed as a percentage of that in the open, averaged 50–75% under banana, 25% under *Inga* and 50% under "mimosa". Intensities under artificial shade in 2 nurseries were 45% and 34%.

1987. Pattabhiraman, T. V.
Successful establishment of *dadaps* [*Erythrina lithosperma*] in coffee clearings.
Indian Coffee, 1953, **17**: 224-6, bibl. 5.

A short description is given of 5 experiments on the propagation of *dadap* by cuttings carried out by the U.P.A.S.I. Scientific Department in 1945/46 and 1946/47. Arising from these trials, recommendations are made for the establishment of the species in coffee plantations.

1988. González, C. A., and others.
El abonamiento del cafeto. Informe divulgativo de los resultados de las investigaciones en progreso periodo Enero 1950–Julio 1953. (**Manuring coffee. Report on investigations in progress, January 1950–July 1953.**)
Suelo Tico, 1953, **7** (29): 144-66.

Zinc and boron deficiencies are widespread in Costa Rica and calcium and manganese deficiencies also occur. An account is given of NPK experiments on the Central Plateau.

1989. Franco, C. M., and Camargo Mendes, H.
Deficiência de microelementos em cafeeiro. (Nota preliminar.) (**Minor element deficiency in coffee. Preliminary note.**)
Bol. Super. Serv. Café, S. Paulo, 1953, **28** (318): 19-22, bibl. 2, illus.

A common disorder of coffee trees in São Paulo State is characterized by small deformed leaves with chlorotic spots. Seriously affected shoots are leafless except at their ends. In a severely affected 7-year-old yellow bourbon plot at the Experimental Centre of the Agronomic Institute, spraying with a mixture of zinc sulphate, manganese sulphate, copper sulphate, borax and ammonium molybdate cleared the symptoms in 6 months.

1990. Antunes Filho, H.
Sementes "moca" e "concha" no café Mundo Novo. **(Pea and twin berries in Mundo Novo coffee.)**
Bol. Super. Serv. Café, S. Paulo, 1953, **28** (317): 8-16, bibl. 5.

Some progenies of Mundo Novo coffee, a bourbon variety that originated in São Paulo State, produce a large quantity of deformed fruits. The occurrence of normal and abnormal beans was studied in 15 progenies in 1950–52. The number of pea beans and of twin beans (from a single locule of a one- or two-loculed fruit) was found to vary from year to year and season to season. The presence of twin beans in one- and two-loculed fruit showed that the atrophy of one locule is not connected with deficient pollination.

1991. Bernal E., G., and Castano A., J. J.
Consideraciones para combatir los musgos del cafeto. **(Control of moss on coffee.)**
Agric. trop. Bogotá, 1953, **9** (9): 37-42, illus.

In tests at Chinchina and Calcarcá both perenox (400 g. per 100 l. water plus ½ l. waste motor oil at 2 l. per tree) and copper-A compound (624 g. per 100 l. water plus oil) effectively freed coffee trees from moss, stimulated their growth and prevented severe attacks of several diseases. The cost was much less than that of demossing by knife which has the further disadvantage of causing wounds.

1992. Duruz, W. P.
Spray controls coffee blight in Nicaragua.
Foreign Agric., 1953, **17**: 204-5, illus.

It has been shown in Nicaragua that spraying new leaves and shoots of coffee with a copper fungicide, such as cuprocide at 2½ lb. to 50 gal. water plus 1¼ qts oil sticker, will provide effective protection against koleroga or thread blight disease caused by *Pellicularia koleroga*.

1993. van Suchtelen, N. J.
Koffiekanker. **(Coffee canker.)**
De Surinaamse Landbouw, 1953, **1**: 48, from abstr. in *Landbouwk. Tijdschr.*, 1953, **65**: 784.

A wilt disease of coffee has been known in Surinam since the beginning of this century. Recent investigations have shown that this is identical with a disease that occurred locally in Indonesia on arabica coffee. Infection trials showed that this was caused by the fungus *Ophiostoma coffeae*. None of the types of coffee grown in Surinam appears to be immune. The life history of the fungus makes control difficult, but the problem is being investigated.

1994. Wellman, F. L.
Información encontrada durante el estudio del herrumbre del café (gen. *Hemileia*) en Africa y Asia. **(Information obtained during the study of coffee rust (*Hemileia*) in Africa and Asia.)**
Suelo Tico, 1953, **7** (29): 80-5.

The author summarizes information obtained during a visit to Africa and Asia in 1952. Topics discussed are incidence in relation to altitude in Africa, effect of field conditions (shade, mulching, soil fertility, cultivation and soil type), climate and spraying technique in countries where spraying is effective, susceptibility of species and varieties.

1995. Fraselle, J. V., Vallaeys, G., and de Knop, O.
La lutte contre la trachéomycose du caféier à Yangambi et le problème que pose actuellement cette maladie au Congo belge. **(The control of coffee tracheomycosis at Yangambi and the problem caused by the disease in the Belgian Congo.)**
Bull. Inf. INEAC, 1953, **2**: 373-94, illus.

Fusarium tracheomycosis, previously unknown in the Belgian Congo, caused severe losses in robusta coffee plantations in the colony in 1949. The control measures adopted have made it possible to neutralize the primary centre of infection and to maintain the disease in an endemic state in lightly infected areas. A regular watch is kept on all trees and as soon as infection is confirmed a 10% aqueous solution of carbolineum is applied to the aerial parts at the rate of 2 l. per tree. Within the next few days the tree is cut down and burned on its growing site, the site subsequently being sprayed with 2 l. carbolineum solution. Monthly inspections are made since the course of the disease is very rapid, generally 2–3 weeks between the first signs of dieback and death. The parasite ordinarily gains entry through the collar or superficial roots. Multiple-stem trees are more susceptible than single-stem trees. Additional precautions are the prohibition of the use of tools in cleaning round the tree and the painting of pruning and other wounds with vegetable tar.

1996. Le Pelley, R.
Insecticidal treatments against the mealybug ant (*Pheidole punctulata*) on coffee.
Mon. Bull. Coffee Bd Kenya, 1953, **18**: 569.

Control experiments were undertaken at Lower Kabete in 1951 and 1953 with DDT, chlordane and dieldrin. In the first trials both DDT and chlordane with perenox added as a sticker and colorant were effective when sprayed on the trunks and main stems up to 2 ft. Dieldrin emulsion was also effective, the most economical effective strength lying somewhere between 1: 12 and 1: 48. The insecticide was sprayed on to the trunks of multiple-stem trees in bands 1 ft. wide.

1997. Bond, J. A. B.
A brief summary of the results of work carried out by a research team of Pest Control (UK) Limited on the chemical control of coffee mealybug (*Planococcus kenyae*) and its attendant ant (*Pheidole punctulata*) 1951-1952.
Mon. Bull. Coffee Bd Kenya, 1953, **18**: 570-1.

Notes are given on ant control by spraying the soil and lower parts of the stems with chlordane and on direct control of the mealybug by spraying breeding sites and sucker growth with parathion. The importance of regular weed control, desuckering, pruning and stump treatment in preventing outbreaks is stressed. A treatment table of recommended control measures is given: (1) for localized, not normally recurrent attacks: one application of ant treatment; (2) for local annual attacks: ant control a few weeks before the long or short rains, decentering and desuckering, treatment of mealybug breeding sites; (3) regeneration suckers infested at base of tree: ant and mealybug control and

removal of unwanted suckers, mealybug control after short rains and harvest but before the mealybugs move up into the multiples; (4) for incipient attack on epidemic scale: widespread ant control; (5) for heavy over-all infestation: ant and mealybug control followed by plantation hygiene; (6) for infested seedling beds: mealybug and ant control. There is no evidence of toxic residues or tainting from these treatments but parathion spraying should not be done within 4 weeks of harvesting.

1998. PRIMROSE, C.
Some observations on the control of green bug.
Indian Coffee, 1953, **17**: 187-8.
It is suggested that the reduction in incidence of the entomogenous fungi *Cephalosporium* and *Empusa* by the use of copper sprays against leaf diseases accounts for the abnormal increase of the green bug.

1999. DO AMARAL, S. F.
Considerações sôbre o "bicho mineiro" e sua importância econômica. (**Reflections on the coffee leaf miner and its economic importance.**)
Biológico, 1953, **19**: 85-92, bibl. 3, illus.
The author questions whether the defoliation generally associated with attack by *Leucoptera coffeella* is due mainly to the leaf miner or to the dry weather during which it appears. The use of BHC to control the pest may in fact be uneconomic.

2000. DECASTRO, V.
Lavado de café con soda cáustica. (**Washing coffee with caustic soda.**)
Rev. Café, 1953, **8** (9): 31, 33, from abstr. in *Turrialba*, 1953, **3**, No. 178/53.
The percentage of good beans was higher in coffee (green or mature, with or without the silverskin) when washed with water than when washed with caustic soda.

Mangoes.

(*See also* 2079a.)

2001. ANAND, J. C., AND JOHAR, D. S.
Cold storage of green mangoes for preparation of chutneys.
Indian Food Packer, 1953, **7** (2): 9-11, from abstr. in *Food Sci. Abstr.*, 1954, **26**, No. 241.
It was found that: (1) green mangoes can be stored for about 40 days at 40–43° F. and 85–90% relative humidity; (2) non-fibrous varieties withstood cold storage better than fibrous varieties; (3) temperatures of 32–35° F. caused physiological breakdown of the fruit, making it unfit for the manufacture of chutney; (4) temperatures above 47° F. induced stem-end rot and decay, due chiefly to *Glomerella cingulata*; and (5) the percentage yield of slices from the fruit increased with temperature of storage from 32° to 45° F.

2002. MATHUR, P. B., SINGH, K. K., AND KAPUR, N. S.
Refrigerated preservation of seedling mangoes.
Indian Food Packer, 1953, **7** (4): 7-11, from abstr. in *Food Sci. Abstr.*, 1954, **26**, No. 240.
Seedling mangoes were stored at temperatures ranging from 32° to 55° F. with a relative humidity of 85–90%, and at 62–65° F. with R.H. 75–80%; they were examined after 14, 28 and 42 days. The physiological losses in weight were least at 42–45° F. The percentage of total soluble solids increased and the total acidity decreased at all temperatures. Retention of ascorbic acid was greatest at 42–45° F. The optimum temperature range for the cold storage, for up to 42 days, of seedling mangoes intended for the preparation of chutneys and pickles, as well as for immediate edible purposes, was 42–45° F. with R.H. 85–99%. Mangoes intended for table use could be ripened satisfactorily in about 2 weeks at 62–65° F. [See also *H.A.*, 24: 925.]

2003. BOSE, A. N., AND BASU, G.
Extension of storage-life of Fazli mango by coating with paraffin.
Sci. and Cult., 1953, **19**: 263-4, bibl. 1.
Dipping mangoes in the stage B of maturity* for 10 seconds in molten paraffin wax at 80° F. extended the storage life of the fruits to 44 days if they were kept for 42 days at 55° F. and 90% relative humidity and thereafter for 2 days at room temperature. Fruits treated in this manner had the flavour, texture and colour of fresh ripe mangoes. Data are given of the effects of paraffin coating on respiration and transpiration.—Coll. Engng Tech., Calcutta.

Oil palms.

2004. PRONK, F.
Vergelijkend tros-analystisch onderzoek van enkele typen van de oliepalm (*Elaeis guineensis* Jacq.). (**A comparative analytical study of the bunches of some types of oil palm (*Elaeis guineensis*).**) [English and Indonesian summaries ½ p. each.]
Bergcultures, 1953, **22**: 527-33, 573-81, bibl. 10.
Bunches from 5 types of oil palm, deli dura, import dura, import tenera, deli import dura, and deli tenera, were analysed at the AVROS Experiment Station, Indonesia, during the years 1950 to 1952. A close positive correlation was found for all types between the fruit weight and the total bunch weight. The weight of the bunch after removal of the fruit also showed a strong positive correlation with the total bunch weight. It therefore appears that the total bunch weight is largely determined by the size of the female inflorescence. The subdivision of dura into 3 types and of tenera into 2 types is based on significant differences in the pericarp content of the fruit. The high positive correlation found between the oil/bunch and the pericarp/bunch ratios makes it possible to determine the oil content of trees even where equipment is not available for oil analysis, and allows the basis of selection to be extended. The importance of parthenocarpic fruit development, especially in import dura and import tenera, is discussed. A survey of fruit types indicated the importance of selecting duras (with a view to crossing dura × pisifera) for small kernel and high pericarp content, shell thickness being of minor importance.

* As defined by Cheema and Dani, *Bull. Dep. Agric. Bombay* **170.**

2005. Scheidecker, D., and Prevot, P.
Nutrition minérale du palmier à huile à Pobé (Dahomey). (**Mineral nutrition of oil palms at Pobé, Dahomey.**)
Oléagineux, 1954, **9**: 13-19, bibl. 6.

Investigations were conducted on the variations in N, P, K, Ca and Mg contents with ageing of the leaf and on seasonal variations in the mineral nutrition of palms of 3 to 27 years old, as determined by leaf analysis. Samples were taken from the middle third section of leaflets taken from the middle third section of one of the first leaves to attain full length. It was found that (1) with increasing leaf age there is an impoverishment in N, P and K and an enrichment in Ca; (2) the differences between palms of the same age are greatest at the end of the dry season; (3) there is considerable seasonal variation in leaf mineral content; (4) K deficiency and often N deficiency occur very early in life and are accompanied by a fall in P; (5) P, K and Mg contents are highest at the end of the dry season while N is very constant; (6) N, P and K contents are lowest at 12 years old (i.e. 10 years after planting out); and (7) N, Ca and Mg contents are significantly and P non-significantly higher in the morning than in the evening while K content is higher in the evening than in the morning.

2006. Althuisius, F.
De invloed van trossen van het tenera-type op het bereidingsproces van palmolie en palmkernen. (**The effect of tenera-type bunches on the palm oil and palm kernel extraction process.**) [English and Indonesian summaries 12 and 16 lines respectively.]
Bergcultures, 1953, **22**: 455-61.

The factory processes for palm kernel and palm oil extraction in Sumatra are at present designed to deal with the hard-shelled dura-type bunches. A preliminary investigation was carried out to determine the effect of using thin-shelled tenera bunches, either alone or mixed with dura bunches, on the present factory operations. Although it is considered that difficulties will be encountered, particularly in the cracking process, generalizations could not be made owing to the variation in factory equipment. The differences in composition of dura and tenera bunches are tabulated and discussed.

Papaws.

2007. Greenway, P. J., and others.
The papaw: its botany, cultivation, diseases and chemistry.
Pamphl. Tanganyika Dep. Agric. **52,** 1953, pp. 32, bibls., illus., 3s.

This publication consists of four parts, the first three of which were originally published in the *E. Afr. agric. J.* in 1948 and are now reprinted with some amendments. These are: "The papaw or papaya ", by P. J. Greenway; "Papaw culture", by G. B. Wallace; and "Diseases of papaw and their control", by G. B. and M. M. Wallace [for abstracts of original papers see *H.A.*, 18: 2236-2238]. Part IV, on the "Chemical aspects of papain", by E. V. R. Khomo, deals with the stabilization of papaw latex by using SO_2 to destroy oxidases and peroxidases, drying temperatures, keeping properties, discoloration of papain, the estimation of its proteolytic activity, and, very briefly, its uses.

2008. Kebby, R. G.
Papaw culture.
Agric. Gaz. N.S.W., 1953, **64**: 518, 560, 566-9, illus.

Papaws grow well in many far north coast districts of New South Wales, but irrigation is desirable. Variations due to open pollination can be overcome by line breeding. Notes are given on a breeding line developed from the bisexual elongata type at the Duranbah Demonstration Plot, Tweed River, whereby selected seed from the female of the second generation, when pollinated by the bisexual tree, produces half bisexual and half female trees; the latter give the highest production of excellent quality fruit. Notes are given on sowing (December–January), transplanting (February–March at 6×6 to 12×12 feet), cultivation, manuring, harvesting (August–March) and packing.

2009. Hamilton, R. A.
Papayas grown on shallow clay soil.
Hawaii Fm Sci., 1954, **2** (3): 7-8.

Six planting methods were compared for papaws established on a clay loam soil with a tightly compacted subsoil 6–14 in. below the surface: 1. Check (small standard planting holes), 2. planting pits (3 cu. ft.) plus heavy surface mulch, 3. pits with soil replaced, 4. pits with soil limed and replaced, 5. holes prepared by blasting, and 6. pits filled with a 50: 50 mixture of soil and well rotted napier grass compost. The only treatment to produce a highly significant increase in stem diameter and plant height at 11 months was No. 6. As treatment No. 3 showed no improvement over the control it is clear that the beneficial effect of treatment No. 6 resulted from the presence of the compost and not from loosening of the subsoil.

2010. Storey, W. B.
Why papaya trees fail to fruit.
Ext. Circ. Univ. Hawaii **339,** 1954, pp. 10, illus.

The chief causes of unfruitfulness in the papaw are discussed. These are unpollinated female trees, male trees, summer-sterile bisexual trees, insufficient water, insufficient nutrients, poor soil aeration, poor drainage, root or stem and leaf diseases, mite and insect damage, and spray injury.

2011. Choudhari, B. L.
Seedless papaya.
Indian Fmg, 1953, **3** (9): 14-15, illus.

Preventing pollination of female papaw flowers by bagging results in the formation of seedless fruit, which is generally rather small and tasteless.

Pineapples.

2012. Manuel Perez, V.
Algunos ensayos para mejorar el cultivo de la piña. (**Some attempts to improve pineapple cultivation.**)
Rev. Agric. Costa Rica, 1953, **25**: 365-91, bibl. 3, illus.

In this graduation thesis an account is given of various cultural experiments on Spanish Red pineapples conducted in Alajuela province in 1945–49. The

conclusions drawn include: (1) to obtain well developed planting material and thus advance the first harvest of the new crop by 8–10 months stem suckers should be left growing on the mother plant for 6–8 weeks after harvesting before being planted; (2) this practice combined with the use of 2,4-D can hasten harvest by 11–13 months and thus provide fruit out of season; (3) yield can be doubled by planting in double instead of single lines; (4) the present system of planting straight lines up and down the slope should be replaced by contour planting; (5) leaf lopping to facilitate earthing up should be abandoned as it reduces fruit quality and size; (6) in addition to accelerating the first harvest of the new crop, leaving stem suckers on the mother plant delays the next harvest by delaying flowering; (7) by using 2,4-D fruit can be obtained all the year round.

2013. Brown, F. B.
Pineapple varieties and selection in Malaya.
Malay. agric. J., 1953, **36**: 237-46, illus.

Following an outline of the history of the pineapple in Malaya descriptions are given of the following varieties with their synonyms: Singapore Spanish Pine, Green Selangor with 4 strains A, B, C and D, Mauritius, and Sarawak (Smooth Cayenne or Kew). Characters which should be looked for and avoided in selecting planting material are discussed. Methods described for obtaining a rapid increase of planting material from selections are the stem-slice method, the use of crown, slip and sucker segments, and methods of stimulating basal suckering.

2014. Dupaigne, P.
Les différences d'indice de maturité entre les diverses parties des fruits (oranges et ananas). **(Differences in maturity index between different parts of orange and pineapple fruits.)**
C.R. Acad. Agric. Fr., 1953, **39**: 737-40, bibl. 7.

In several consignments of Washington Navel oranges the average maturity index was some 20% greater in the navel than in the rest of the fruit. The maturity index, refractometric index and acidity in the navel were 10·2, 12·77 and 166 respectively, and 8·4, 12·1 and 187 in the rest of the fruit. In pineapples the maturity index was much higher at the base than at the apex. The maturity index, total sugars content and acidity at the base were 16·3, 176 g./l. and 170 ml./l. and 6·6, 95 and 226 at the apex. The maturity index on the north side of pineapples from Guinea was slightly higher than that on the south side, 11·2 compared with 11. The northern side was somewhat richer in both sugars and acids; this confirmed a hypothesis that a relationship exists between respiratory intensity and temperature.

2015. Miller, E. V., and Marsteller, R. L.
The effect of parachlorophenoxyacetic acid on physiological breakdown of the fruits of the pineapple (*Ananas comosus* L. Merr.).
Food Res., 1953, **18**: 421-5, from abstr. in *Food Sci. Abstr.*, 1954, **26**, No. 227.

Natal pineapples on a commercial plantation in Florida were sprayed 10 or 30 days before harvest with solutions containing 400 or 800 p.p.m. of parachlorophenoxyacetic acid (PCPA). When applied 10 days before harvest, both concentrations of PCPA decreased the amount of physiological breakdown which occurred during transport and ripening. The percentage of sound fruits resulting from treatments applied 10 days before harvest were: control, 0%; 400 p.p.m. PCPA, 35%; and 800 p.p.m. PCPA, 63%. Sprayed fruits contained significantly greater quantities of ascorbic acid than the controls. Spraying 30 days before harvest did not decrease the amount of physiological breakdown, but caused the fruits to be slightly smaller. The crowns of the treated fruits were also slightly smaller than those of the controls; about 10% of the fruits which had been sprayed with 800 p.p.m. PCPA had lost their crowns upon arrival at the laboratory. Total soluble solids, total acids, pH, and flavour of the juice were not affected by any of the treatments.

2016. Huet, R.
Contribution à l'étude du "jaune" de l'ananas en Guinée. **(Contribution to the study of the "yellow" disorder of pineapples in French Guinea.)**
Fruits d'Outre Mer, 1953, **8**: 544-7, bibl. 6, illus.

In this disorder, which has been observed for some years in French West Africa, the flesh of fully developed but unripe pineapples becomes soft, yellow and translucent, and this renders them unfit for export fresh or for canning in slices. Chemically the flesh has the characters of an abnormal maturation. The disorder was rare in Guinea in the 1952–53 dry season but became common a fortnight after the rainy season began. It was commoner in plants on slopes than in those in low-lying sites. The cause is thought to be nutritional, the accelerated maturation being due to a sudden increase in the water supply. A tentative recommendation for control is to ensure maturation in seasons when weather conditions do not markedly fluctuate by hastening ripening with hormones.

2017. Ginsburg, L.
The storage quality of Queen pineapples.
Fmg S. Afr., 1953, **28**: 430-2, bibl. 3, illus.

The "waterlogging" disorder of pineapple fruits was described earlier [see *H.A.*, 23: 3572]. Further storage tests were carried out on 2 consignments of Queen pineapples, of which one showed virtually no waterlogging and the other a high proportion of waterlogged fruits at the time of receipt. The results indicate that waterlogging is a physiological disorder originating in the field, and that waterlogged fruits break down within 5 days of removal from cold storage and are thus unfit for export.

2018. Wolfenbarger, D. O., and Spencer, H.
Insect control on pineapples.
Circ. Fla agric. Exp. Stats **S-36,** 1951, pp. 6.

The major pest, pineapple mealybug (*Pseudococcus brevipes*), is controlled by cultivation before planting to destroy weed growth, by fumigation of planting material with methyl bromide (perfect control), or dipping in parathion (partial control), and by spraying or dusting planted stock with parathion. The next most serious pest, the pineapple mite, *Dolichotetranychus floridanus*, is controlled by the fumigation of planting stock with methyl bromide (partial control) and by

sulphur dusting of field plantings. Grasshoppers, crickets and the pineapple red scale (*Diaspis bromeliae*) are usually minor pests but can be controlled by spraying and dusting planted stock with parathion. [See also *H.A.*, 23: 1304 and 1305.]

2019. Abraham, E. V.
A pest of new importance on pineapple in Wynad area of the Madras State—the mealy bug *Pseudococcus brevipes* Cockerell.
S. Indian Hort., 1953, **1**: 99-104, bibl. 15.
Attempts at biological control with *Cryptolaemus montrouzieri* were ineffective. Parathion and HETP showed promise in preliminary trials.

2020. Menezes Mariconi, F. A.
O "percevejo do abacaxi" (*Lybindus dichrous* Stal, 1859). (**The pineapple bug, *Lybindus dichrous*.**) [English summary 8 lines.]
Biológico, 1953, **19**: 155-62, illus.
This bug was identified in Argentina for the first time in 1953, has been found in 5 localities and has done serious damage to pineapples. In control experiments parathion gave 80% kill and BHC 60% kill after 24 hours.

Rubber trees.

(*See also* 2078h, 2079c, e.)

2021. Rubber Research Institute of Malaya (Akhurst, C. G.).
Annual Reports of the Soils Division of the Rubber Research Institute of Malaya for 1949-51, 1953, pp. 17 (1949), 21 (1950) and 17 (1951).
The investigations undertaken are described under 5 sections, namely soil survey, manuring of *Hevea*, cultivation and cover crops, mechanical cultivation and laboratory.

2022. de Silva, C. A.
Clonal seed as planting material.
Adv. Circ. Rubb. Res. Inst. Ceylon **39,** 1953, pp. 8, illus.
After a preliminary note on clonal seed as planting material and a classification of clonal seed (legitimate, near-legitimate and illegitimate) the following topics are covered: the performance of Prang Besar Isolated Garden and selfed Tj.1 seedlings in Ceylon, general policy for estates, selection of improved clones, and the collection and planting of clonal seed. Seed characters useful for identification work are indicated with seed of Tj.1 as an example. This circular supersedes Nos. 26 and 27.

2023. Vollema, J. S.
Identificatiekenmerken van enige nieuwere heveaclonen. (**Identification characters of some new hevea clones.**)
Arch. Rubbercult., 1953, **30**: 41-67, illus.
Descriptions, notes and illustrations are given for 7 new hevea clones, namely AV 385, LCB 479, PR 226, 228 and 231, RRI 501 and WR 101. The vegetative characters of young and sometimes older buddings in the Tjiomas trial garden are described and their latex reactions recorded.

2024. de Silva, C. A.
Notes on replanting procedure.
Quart. Circ. Ceylon Rubb. Res. Inst., 1953, **29** (1/2): 3-12.
Clones recommended for large-scale planting in Ceylon are PB 86, AV 255, PR 107, WG 6278, MK 3/2, RRI 501 and RRI 513.

2025. Stenning, L., and Evans, G.
The propagation of *Hevea brasiliensis* from cuttings.
Kew Bull., 1953, No. 4, p. 592.
Cuttings of *Hevea brasiliensis* clones and of *H. spruceana* and *H. benthamiana* have been rooted at Kew in 8–10 weeks without hormones. Material consisted of leader shoots and side shoots with the upper leaves left intact and with their ends sealed immediately after cutting by dipping in powdered charcoal. The cuttings were set in pots containing sharp sand, and the pots were placed in a propagator frame kept at a temperature of 80° to 90° F. and humidity of about 80%. Fuller details are to be published in the *J. Rubb. Res. Inst. Malaya.*

2026. Anon.
Uses of 2,4,5-T on *Hevea*. Preliminary note.
J. Rubb. Res. Inst. Malaya, 1953, **14**: 179-82, being *Commun.* **288.**
Interim notes are given on the uses of 2,4,5-T on rubber as a defoliant by aerial spraying, as a weedkiller, as a yield stimulant, and as a tree poison. The n-butyl ester applied from the air at various concentrations (for example 2%) in diesel oil at 1 gal. per acre is an effective defoliant of mature rubber and causes some dieback; aerial sprays at higher concentrations may prove useful in tree poisoning. Examples are given of the successful use of Trioxone, a mixture of 2,4,5-T and 2,4-D, against various weeds including bracken (*Gleichenia linearis*), *Eupatorium odoratum* and *Mimosa pudica*. The sodium salt and the n-butyl ester are effective yield stimulants. In a test on illegitimate seedlings of several clones with the sodium salt at 1% as an emulsion in palm oil the mean monthly yield for the first 6 months of treatment was 48·2 g. of dry rubber per tree, compared with 27·3 in the control, an increase of 77%. With the n-butyl ester the yield was 52·5 g., compared with 26·3 in the control, an increase of 100%. In preliminary tree poisoning experiments promise has been shown by the butyl ester and the water-soluble amine when applied at 1–10% to a ring-barked portion of the main stem 9–12 in. in width, using about 1 gal. to 50 trees.

2027. Langford, M. H., and Echeverri, H.
Control of South American leaf blight by use of a new fungicide.
Turrialba, 1953, **3**: 102-5, bibl. 6, illus.
Zinc ethylene bisdithiocarbamate (parzate and dithane Z.78) gave effective control of South American leaf blight (*Dothidella ulei*) in tests in Costa Rica. Sprays of 1·5% parzate, 0·5% phygon and 2% "insoluble" copper (previously the standard control material) were applied at 5-day intervals from May to November 1950, and the leaflet infection rates at the end of that period were 1·1, 2·5, and 68% respectively. 1·5% dithane at 8- and 4-day intervals and 2% insoluble copper at 4-day intervals were applied from November 1950 to September 1951; the leaflet infection rates in mid-June were

4, 2 and 31% respectively. Among many stickers tested the 2 best were triton B-1956 at 4 oz. and rosin emulsion at 1 qt per 100 gal.

2028. Cook, J.
Further notes on the marketing of smallholding latex.
Malay. agric. J., 1953, **36**: 181-9, bibl. 5, illus.

Further experience on the handling of smallholders' latex [see *H.A.*, 21: 1093] has shown that a system involving both latex collection and processing is likely to have a more stable future than the operation of collecting centres disposing of latex as latex. At present only about 2% of smallholders' rubber is marketed in the new way, but sufficient experience has now been gained to justify an extension of the system.

2029. Beaufils, E. R.
Étude des éléments minéraux dans les latex et plus particulièrement du potassium et du cuivre. **(Mineral elements in latex, particularly potassium and copper.)**
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 71-80, bibl. 4.

Analysis of latex samples from clones of different age showed that (1) the K and Cu contents, expressed as a percentage of the latex, are in inverse relation with the D.R.C.; (2) the K and Cu contents are in direct relation with one another when expressed as a percentage of the dry extract; and (3) in the aqueous phase the K content is fairly constant at 0·28–0·29% and the Cu content fairly constant in the ratio of 1: 1,000 with K.

2030. van Gils, G. E., and Resing, W. L.
The accelerated coagulation of latex.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 135-48, b bl. 5.

An account is given of experiments on accelerating latex coagulation with formic acid plus anionic soap, acid plus high valency cations, and acid plus cationic soaps.

2031. Resing, W. L., and de Haan-Homans, L. N. S.
Preservation of latex for a short period.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 81-90, bibl. 2.

Experiments with numerous preservatives led to the conclusion that a completely satisfactory method of temporarily preserving fresh latex has not yet been found. Dehydro-acetic acid plus sequestrene shows promise but is at present too expensive. In cases where temporary preservation is necessary, and subsequent concentration is not, the combination of formaldehyde with phosphates, or with small amounts of ammonia can be used. [See also *H.A.*, 23: 3587.]

2032. Smith, R. H.
Phosphatides of *Hevea* latex.
J. Rubb. Res. Inst. Malaya, 1953, **14**: 169-77, bibl. 9, being *Commun.* **287.**
The phosphatides of the latex of *Hevea Brasiliensis*. I. Biochemical changes.
Biochem. J., 1954, **56**: 240-50, bibl. 19.

An account is given of a fundamental study of the phosphatides in *Hevea* latex. The phosphatides are of considerable practical interest because they are highly surface active and consequently might be concerned in maintaining the colloidal stability of fresh latex. The investigations showed, however, that it is improbable that phosphatide breakdown is generally a factor in spontaneous coagulation.

2033. Smith, R. H.
Certain properties of latex phospholipin and their variation with latex age and preparation conditions.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 41-6.

In a number of fresh latices examined there did not appear to be any appreciable hydrolytic breakdown of latex phospholipin during a period of eight hours' storage. This fact does not support the theory that latex destabilization is caused by the liberation of free fatty acids and the subsequent formation of calcium and magnesium soaps. It is suggested that the latex phospholipin might itself contribute towards the colloidal stability of fresh latex. If this were so then any modification of the phospholipin on storage of fresh latex might be expected to influence the stability. Evidence has been found of changes in the nature of latex phospholipin on storage of fresh latex. [From author's summary.]

2034. van Essen, W. J.
The molecular state of rubber in fresh and in ammoniated latex.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 47-62, bibl. 26.

The molecular weight of rubber in fresh latex obtained from young parts of the plant was found to be lower than that in latex from the trunk. The molecular weight of the rubber in the smallest latex particles in fresh latex is the same as that in the biggest particles. During storage the latex undergoes changes which are greatest for the smallest latex particles, so that ultimately in old preserved latex a final stage is reached in which the molecular weight of the rubber in the smallest latex particles is lower than that in the bigger latex particles. [From author's summary.]

Sugar cane.

(*See also* 2078b, d, i, n, s, t, u, y, 2079b, f, i, k, l, m.)

2035. Hawaiian Sugar Planters' Association.
Report of the Experiment Station Committee for the year ending Sept. 30, 1953, 1953, pp. 77, illus.

By-products. Chicken feed, cattle feed, container board, paper pulp, ammonia. *Cultural practices.* Fertilization, the effect of climate on growth and composition, tillage, soil compaction, soil structure improvement, irrigation. *Diseases.* Disease resistance trials of Hawaiian varieties in Fiji, diseases in Hawaii, nitrification retarded by DD treatment, germination stimulated by hot PMA treatment, hot PMA the best fungicide for setts protection. *Mechanization.* Redesigned cutter machine for irrigated cane, side-mounted cutter-windrower, cutter-loader for wetter areas, cutting-loading unirrigated cane, loading cane

* Containing papers read at the Conference of Rubber Research Institutes in the Far East, Bogor, 1952.

* Containing papers read at the Conference of Rubber Research Institutes in the Far East, Bogor, 1952.

from light windrows, portable dry cleaner, hydraulic grab, rotary hoeing, irrigation flumes. *Varieties.* Flowering control, fuzz viability, varietal position in 1953, breeding, variety trials. *Weed control.* Dispersion of CMU in CADE, new herbicides including URAB (containing 80% phenyldimethylurea), chloro-IPC, non-phytotoxic CADEs, CMU tests, *Oxalis* control. *Miscellaneous.* Rodenticides: coumachlor (tomorin) and pival. [See also separate abstracts below.]

2036. Borden, R. J.
Newer developments in the Hawaiian sugar industry.
Proc. Amer. Soc. Sugar Cane Tech. 1946-1950, 1953, pp. 25-9.

New practices in seed selection and treatment, irrigation, weed control, fertilization, variety trials, maturity determination, harvesting, transport, and training of specialists are briefly discussed.

2037. Queensland.
Fifty-third Annual Report of the Bureau of Sugar Experiment Stations 1952/53, Brisbane, 1953, pp. 55.

The report records increased evidence of lowered K status in cane soils, preliminary results on the liming of acid soils, trash disposal trials, ratoon stunting disease studies, increased use of Q.50 and N: Co. 310, continued effective use of BHC against white grub, testing of New Guinea cane varieties, increased use of velvet beans as green manure, search for cowpea varieties resistant to *Phytophthora* wilt, replacement of normal dipping procedure in some districts by the spraying of organic mercury solutions on to setts dropping from the cutter-planter, and variety trials.

2038. South African Sugar Association.
Annual Report of the South African Sugar Association Experiment Station 1952, 1953, pp. 42, illus.

This "first edition" of the annual report of the South African Sugar Association's Experiment Station, founded at Mount Edgecombe in 1925, has the object of stimulating interest in research. It explains the organization and functions of the Station and gives a review of its past work. The station has 5 departments (Agricultural, Chemical, Pathological, Cane Breeding and Entomological), an Experimental Farm (Chaka's Kraal), and a Propagation and Distribution Farm at Umhlatuzi. The Agricultural Department has been concerned with agronomic problems, irrigation and drainage, fertilizers, variety trials, selection and propagation, and the Chemical Department with leaf analysis, soils, growth rates, by-products, yield data and changes in the popularity of varieties.

2039. Jex, W. F. C.
Looking ahead.
Proc. 27th annu. Congr. S. Afr. Sugar Tech. 1953, pp. 129-30.

Notes are given on promising innovations of method for adoption by South African sugar cane growers. These include soil preparation by chisels instead of ploughing, mechanical planters, mechanical weeders, trash blanketing, ratoon fertilizing with mechanical fertilizers following trash blanketing, hauling by tractors and trailers instead of lorries, transloading with gantries into gollovanes, and mechanical harvesting (not yet practicable). It is suggested that proper co-ordination of trash-blanketing and fertilization provides the means of doubling sugar yield per acre in a very few years.

2040. Garland, H. L.
Some observations in connection with cane growing.
Proc. 27th annu. Congr. S. Afr. Sugar Tech., 1953, pp. 131-2.

Three key operations in South African sugar cane growing are trash-blanketing, fertilization of every acre that is cut each year, and green manuring, preferably with sunnhemp or velvet Somerset runner beans, after 8 years under cane.

2041. Romero Manrique, A.
Algunas observaciones a la industria azucarera del valle del Cauca. **(Some notes on the Cauca Valley sugar industry.)**
Agric. trop. Bogotá, 1953, **9** (9): 9-13.

Notes are given on the following aspects of the Cauca Valley sugar industry which supplies the whole of Colombia's needs: soils, varieties (P.O.J. 2878 is the most widely planted but Manuelita Colombia 666 has given good results in places and is expanding), irrigation and drainage, mechanization of cultivation, and processing machinery.

2042. Anon.
La estación experimental de la caña de azucar de occidente. **(The Sugar Cane Experimental Station of the West.)**
Agric. venezol., 1953, **18** (164): 24-5, illus.

The Station is near Yaritagua and serves the States of Lara and Yaracuy, Venezuela. Its main work is the formation of a collection of local and introduced varieties for comparison, the breeding of high-yielding mosaic-immune varieties, the supply to growers of planting material of guaranteed origin and known performance, mechanization trials, disease and pest control studies, and herbicidal, cultural, fertilizer and irrigation trials.

2043. Locsin, C. S.
VMC contributions on sugarcane varieties.
Philipp. Sugar Tech. Conv., 1953, from abstr. in *Sugar J.*, 1953, **16** (7): 26.

The results of thirty sugar cane variety field tests from 1949 to the first quarter of 1953 are summarized. The conclusion arrived at is that H.37–1933 is first, C.P. 29/116 second, and P.O.J. 3016 third in piculs per ha. in the Victorias-Manapla-Cadiz area. The following features of each of these three varieties is particularly noted: H.37–1933 in certain circumstances is attacked by *Pythium* root rot. P.O.J. 3016 is subject to wind damage and does not stand over well after 12 months, but being a high sucrose cane it may be harvested at 11 to 12 months. C.P. 29/116 tassels heavily even when planted as late as June, hence it is best planted between July and October. A newer variety that exceeds H.37–1933 in yields of sugar is H.44–3098.

2044. Jeansonne, R. J.
Sugar cane—pasture rotation.
Proc. Amer. Soc. Sugar Cane Tech. 1946-1950, 1953, pp. 63-70.

To maintain high fertility levels and desirable soil conditions in sugar cane fields, a cane-sod rotation

system has been worked out in Louisiana. The rotation covers a period of 12 years, divided into 4 years in clover and pasture, 1 in corn/soya beans, 3 in cane, 1 in soya beans and 3 in cane.

2045. Reeser, L. G.
Subtilling in sugar cane fields.
Sugar J., 1954, **76** (8): 14-15, illus.

Subtillage connotes soil shattering operations between surface cultivation and subsoiling. It is economical and is engaging increasing interest in the Caribbean. It does little stirring of the soil at the surface but breaks it from depths as great as 24 in. up to the surface. It reduces run-off and erosion, improves water storage capacity, drainage and aeration, and permits better root development. It can be done at any time during the first 2 months after harvesting and generally without disturbing the trash. One operation per annum is sufficient for ratoon fields. Fertilizer can be applied and old stool roots trimmed during subtilling.

2046. Locsin, C. L., and Guillermo, R. J.
VMC experiment No. 150 ('52). Furrow distancing.
Sugar News, 1953, **29**: 565-8.

Spacings compared for P.O.J. 3016 were (*a*) 40 in. between rows with 8 plants per m. of row, (*b*) 40 in. between rows with 4 hills of 2 plants per m. of row, (*c*) 12 and 28 in. between rows with 4 plants per m. of row,(*d*) 36 in. between rows with 8 plants per m. of row, and (*e*) 36 in. between rows with 4 hills of 2 plants per m. of row. The first three spacings provided 80,000 plants per ha., and the last two 88,000. Differences in sugar yields were insignificant but system (*b*), which produced the second highest yield, may be recommended as the most economical system for these conditions.

2047. Rehbein, C. A.
The Fairymead plant cutting machine.
Cane Grs' quart. Bull., 1954, **17**: 89-90, illus.

The machine, designed for preparing setts, is mounted on a tractor and consists of dual cutting, dipping and bagging components. A circular saw with stationary carriage mounted on either side of the radiator cuts the cane up and a chute delivers the setts into a container holding fungicide solution. They are transported thence by a continuous slat conveyor and delivered into bags. 50–60 men are needed to cut, strip and lay the cane in 2 lines of large bundles between which the machine drives. Six men are required to operate the unit at full capacity, 3 to each component.

2048. Hawaiian Sugar Planters' Association.
Cultural practices. Effects of climate on sugar cane growth and composition.
A.R. Hawaiian Sugar Plant. Ass. Exp. Stat. 1952/53, 1953, pp. 10-13.

Nitrogen uptake and distribution. The rate of N absorption is independent of air temperature but strongly dependent upon root temperature below 80° F. Among the results of recent controlled climate house studies on 2 varieties are: (1) the relative rates of N absorption at different root temperature ranges are 1 at 80–90° F., 1·42 at 70–80° F., 2·72 at 60–80° F. and 1·92 at 60–70° F., but a 18° F. mean air temperature change has no effect, and (2) the optimum root temperature for growth is 80° F. in high air temperatures (81·9° F. mean) and 70° F. in cool air (64·2° F. mean). *Climate and water.* There is a close relationship between water consumption and growth. *Day-degrees and growth.* The hot house, which is 18° F. warmer than the cold house, produced 50% more cane. This figure of 3% per degree is the same as that found for earlier crops.

2049. Hawaiian Sugar Planters' Association.
Cultural practices. Soil improvement operations expanding.
A.R. Hawaiian Sugar Plant. Ass. Exp. Stat. 1952/53, 1953, p. 17.

The experimental incorporation of cane trash and excess bagasse into soils whose poor physical properties limit production has shown that: (1) 15–20 tons per acre give increased yields of 1–2·7 tons sugar per acre; (2) improvements in soil tilth will last a minimum of 10–15 years; (3) the material, after rotting down for 6 months to 2 years depending on climate, is easily incorporated with present tillage equipment; and (4) the N requirements of the cane planted in soils improved with these organic materials are no larger than normal.

2050. Locsin, C. L.
Filter cake as fertilizer.
Sugar News, 1953, **29**: 405-9, bibl. 5.

Several years' experiments showed that 75–100 tons of wet filter cake per ha. can replace 500 kg. of 16–20 ammophos per ha. on certain P-deficient red soils in the Philippines and leave a residual effect of about half this amount for the following crop. The fresh cake should be allowed to decompose for 2–3 months before cane is planted.

2051. Hawaiian Sugar Planters' Association.
Cultural practices. Balanced nutrition.
A.R. Hawaiian Sugar Plant. Ass. Exp. Stat. 1952/23, 1953, pp. 8-10.

Potassium. A survey from 1926 to 1952 showed that the reduction in soil K reserves in most unirrigated plantations has been very great. Another investigation showed that response to added K is rare where the exchangeable K exceeds 110 p.p.m. at the start of the crop but is the rule below 75 p.p.m. *Phosphorus.* The critical level of 20 p.p.m. continues to hold for "low volume weight" soils. *Nitrogen.* The use of liquid ammonia is discussed.

2052. Schroo, H.
The use of pot tests in research on the fertility of sugar-cane soils. Paper I. General principles and technique of pot tests with special reference to cane. Paper II. A pot test with potash, lime and magnesia on the early response of cane grown on Talparo red clay.
Trop. Agriculture Trin., 1953, **30**: 199-205, illus., and 206-15, bibl. 12.

In the first paper 3 types of pot test are described:— (1) Tests designed to investigate the nutrient status or other properties of the soil as measured by the early response of a given cane variety to various treatments; the cane is grown for 4 months in double kerosene [petrol] tins with a combined volume of 8 gal. (2) Similar but longer tests in which 40-gal. drums are used. (3) Tests in which the cane is used as a soil-exhauster to gauge the relative value of a "single factor", e.g. the

potash status of various fields in an area; in this case the cane is grown for 3 months in the restricted volume of soil held by single kerosene tins. Notes are given on soil sampling, preparation of containers, experimental lay-out, planting, and growth and leaf analysis determinations.

The second paper describes a pot test of type I in which the effects of each of 3 factors, KCl, $CaCO_3$ and $MgSO_4$, were tested at 2 levels, one of which was nil. The results indicate that K increased fresh weight and shoot length and the uptake of N and P, greatly increased the uptake of K and Fe, and increased the yield response to Ca. Ca increased fresh weights but did not accentuate yield response to K; alone or with K it greatly increased the uptake of Fe; it had a negligible effect on N uptake and a moderating effect on Mg toxicity; it did not increase Ca uptake and its beneficial effect is believed to be due to the restoration of impaired root-functioning under acid-toxic soil conditions. Mg depressed growth and nutrient uptake, especially the uptake of N and P.

2053. Rege, R. D., and Mascaranhas, J. P.
Biochemical studies in the mineral nutrition of sugarcane.
Poona agric. Coll. Mag., 1953, **44**: 53-9, bibl. 3.

In an experiment with Co. 419 on a calcareous soil N and P_2O_5 were applied in the proportions 2: 1, 2: 2, 2: 3, and 2: 4, rates for N being 375 and 450 lb. per acre. Increasing the proportion of P_2O_5 resulted in higher tillering but only in the early growth stages, greater stalk girth, earlier maturity, and greater sugar recovery, without affecting cane tonnages. The optimum response was obtained from the 2: 2 ratio based on 450 lb. of each nutrient. The higher proportions of P_2O_5 tended to cause greater absorption of N, P and K during the early growth phase, but by harvest time the N and K contents, per ton of cane or sugar, of the high P_2O_5 plants were depressed; Ca contents were unaffected.

2054. Olive, F. R., and Flores A., M. A.
Ensayos de fertilizantes para caña de azúcar. (**Sugar cane fertilizer trials.**) [English abstract 12 lines.]
Turrialba, 1953, **3**: 80-5, bibl. 7.

Studies on the use of fertilizers at two locations in the main sugar cane producing areas of El Salvador were conducted during the years 1947 to 1950 by the Centro Nacional de Agronomía. Treatments consisted of 16 application rates of N, P and K in various combinations ranging from 0–0–0 to 128–128–256 lb. of N, P_2O_5 and K_2O respectively. The results obtained over the four years show a highly significant response to application of N at both locations but none to P at either location. At one location but not the other there was a significant response to the application of K. The yields of the cane crop steadily declined with successive crops but the rate of decline was not so great on the plots receiving N as on the check plots.

2055. King, N. C.
Results of mosaic tolerance trials.
Proc. 27th annu. Congr. S. Afr. Sugar Tech. 1953, pp. 120-8, bibl. 3, illus.

After an outline of the history of mosaic in Natal an account is given of experiments in which healthy and infected setts of 7 varieties were planted. The effects of mosaic on plant and ratoon yields and on average weights of stalks were compared. Co. 281, Co. 301, N: Co. 291 and N: Co. 339 were found to be susceptible but tolerant, while N: Co. 310, N: Co. 349 and Co. 331 are susceptible but not tolerant. As no suitable immune variety is available the use of susceptible but tolerant varieties—a practice found satisfactory in other countries—is recommended. The growing of tolerant and non-tolerant varieties together is undesirable.

2056. Mungomery, R. W.
Clean cane for combating ratoon stunting disease.
Cane Grs' quart. Bull., 1954, **17**: 92-3, illus.

Recent surveys have shown that ratoon stunting disease is widespread in Queensland and that all commercial cane varieties must be suspect. Accordingly Cane Pest and Disease Control Boards have begun to build up clean stocks of all varieties by hot water treatment. As soon as adequate supplies of healthy plants are procurable growers will be expected to make their plantings entirely from clean sources.

2057. B., G.
Hot water treatment of cane plants in the Mulgrave area.
Cane Grs' quart. Bull., 1954, **17**: 78-9, illus.

There is a definite varietal reaction to hot water treatment against ratoon stunting disease. Pindar and Cato, for example, generally stand treatment well, while Trojan and S.J. 4 are easily damaged and poor germination is obtained with many varieties. Temperature appears to be the governing factor. Rules for better germination are: (1) handle carefully; (2) plant under the best possible conditions of moisture, temperature, cover, etc., avoiding cold weather; (3) discard the top of the plant if planting early with immature cane and the bottom if planting late; (4) do not let plants either sweat by stacking bags when hot, or dry out before planting.

2058. Arruda, S. C.
A produção da muda selecionada de cana em face da doença "carvão". (**The production of healthy setts in the presence of sugar cane smut.**)
Biológico, 1953, **19**: 127-33, illus.

The 2 means of spreading sugar cane smut are by diseased setts and by secondary infection of growing cane by wind-borne spores. Recommended control measures are the restriction of the movement of setts, the abandonment of a nursery as a source of supply as soon as a case of infection is discovered, the establishment of numerous small nurseries on large estates to minimize the risk of spread, and the maintenance of inspected nurseries by small growers. It is considered that the incidence of secondary infection in resistant varieties can be kept down when foci of infection from susceptible varieties have been eliminated. Where a susceptible variety has been eliminated immediate replanting with a resistant variety is permissible but rotation with another crop is preferable.

2059. Narayanan, E. S.
Sugarcane leaf hopper, *Pyrilla perpusilla* Walker.
Indian Fmg, 1953, **3** (9): 8-9, 30-1, illus.

Descriptions are given of the pest and some of its

parasites and predators. Multiplication of parasites has in some cases given encouraging results. Where sudden outbreaks of leafhoppers occur suggested control measures are the collection of egg masses, collection of adults and nymphs with hand nets, and spraying with 0·25% BHC or DDT or dusting with 4–5 BHC.

2060. Dick, J.
Mealybug and its effect on sugarcane.
Proc. 27th annu. Congr. S. Afr. Sugar Tech. 1953, pp. 113-19, bibl. 8, illus.
This is an interim account of work in progress at the South African Sugar Association Experiment Station, Mount Edgecombe, Natal. Experiments were carried out on the effects of the mealybug (*Trionymus sacchari*) on germination, cane yield and sucrose yield, on the persistence of depressing effects after removal of the insects, and on inoculation of cane with mealybug body-fluid. The conclusions are that, though evidence is at present too slight to determine whether the mealybug is toxicogenic, the depressing effect on early growth caused by infestation of the setts appears to have been proved, and the persistence of at least part of this effect, when the insects have been removed, suggests that the direct effect of feeding is not the only factor involved. Further investigations on these lines are contemplated. [See also *H.A.*, 23: 4699.]

2061. Paturau, J. M.
Le moissonnage mécanique de la canne. (**Mechanical harvesting of sugar cane.**)
Rev. agric. Maurice, 1953, **32**: 152-8, illus.
Mechanical harvesting deserves serious consideration in Mauritius where labour output is well below that of certain other cane-producing countries and where, to make the best use of the period of optimum maturity, the harvest should not exceed 95–100 days. Brief notes are given on harvesters in use in Louisiana, Hawaii and Queensland, and on loaders.

2062. Anon.
The sugar content of standover cane.
Cane Grs' quart. Bull., 1954, **17**: 95.
The c.c.s. of standover cane was sampled monthly from June 1952 to June/July 1953. In Trojan plant cane (planted September 1951) butts and butts plus tops reached a peak in c.c.s. in January 1953 and then fell slightly but appreciably until July. In P.O.J. 2878 first ratoons (ratooned September 1951) both butts and tops showed a steady increase throughout the period, and butts plus tops reached a peak in June 1953 when the c.c.s. was almost identical in butts and tops. It is concluded that standover P.O.J. 2878 could be of value for early cutting and that southern mills could start the season at a much earlier date provided the supply of standover cane was adequate.

2063. Arceneaux, G., and Davidson, L. G.
Test of cyanamid for killing sugar cane foliage in advance of harvest.
Proc. Amer. Soc. Sugar Cane Tech. 1946-1950, 1953, pp. 75-80.
Aeroplane applications of various rates of finely pulverized cyanamide severely scorched the fully exposed topmost leaves of sugar cane but did not greatly improve the condition of the trash as a whole for burning. The chemical applied about 1 month before harvest did not affect the rate of juice extraction, but it retarded sucrose accumulation.

2064. Blundell, E.
Surface mulching of crop residues in ratoons.
Cane Grs' quart. Bull., 1954, **17**: 96-9, illus.
A cane grower describes a successful method of surface mulching in which cane tops left after cutting burnt crops are aligned along alternate inter-rows. The succeeding crop's trash is placed in the same inter-rows. In 1952 his yield was 48 tons per acre compared with a district average of 29.

2065. Wiggins, L. F.
The sugar cane as a source of industrial chemicals and materials.
Sugar J., 1954, **16** (8): 18-25.
Sugar cane is one of the most efficient of all plants in the fixation of atmospheric carbon, its yield being about 5 tons per acre, and with the gradual exhaustion of the world's coal and oil resources this carbon will ultimately become of considerable importance to the chemical industry. The 5 products—sucrose, cane tops and leaves, bagasse, filter press mud, and molasses—are examined for their present and future utility. One essential and key material is missing from the long and diversified list of chemicals that can be manufactured from them: benzene. "If it was possible easily to convert carbohydrates into this substance, then there would indeed be little in modern chemical industry which could not be obtained from sugar cane."

Tea.

2066. Guinard, A.
La culture du thé en Indochine. (**Tea growing in Indo-china.**)
Arch. Rech. agron. pastor. Viêt-Nam **20**, 1953, pp. 179, bibl. extensive, illus.
This detailed bulletin covers all aspects of tea growing in Indo-China except diseases and pests which were fully dealt with by Du Pasquier in his "Les principales maladies parasitaires du théier et du caféier en Extrême-Orient" (Hanoi 1933). It is in 5 parts, namely a study of the tea plant, its culture in the neighbourhood of Blao, the preparation of black and green teas, and the present position regarding tea growing in Indo-China. Some of the many indigenous types of tea occurring in the country are of value and the culture of selected varieties is expanding rapidly on the high plateaux of southern Indo-China. Notes are given on the clonal selection of Shan varieties at Blao Research Station. Subjects discussed in some detail under tea culture are soils and climate, nurseries, planting, manuring, weed control and surface cultivation, training and pruning, and harvesting. Hedge planting trials have given promising results. Notes are given on the chief tea-growing centres in Indo-China, the varieties grown in each, methods of culture, and production.

2067. Guinard, A.
Théiers. (**Tea.**)
Arch. Rech. agron. pastor. Viêt-Nam **19**, 1953, pp. 101-29, illus.
Work reported in the triennial report of the Agronomic Research Station at Blao included variety trials, hedge culture and the selection of Shan teas. Hedge culture

studies included sowing dates, manuring, formation pruning (including the double-sloped "pulpit" system) and the use of *Tithonia* to provide temporary shade and mulch.

2068. Indian Tea Association, Tocklai.
Annual Report of the Indian Tea Association, Scientific Department, Tocklai Experiment Station, for 1952, 1953, pp. 96.
Agrobotanical Branch. Plant physiology: the interactions of nitrogen and light. Agronomics and breeding: selection of seed-bearing plants; time of planting *Albizzia stipulata*; heading back nursery plants; transplanting baskets. *Biochemical Branch.* Fundamental research and manufacturing experiments. *Plant Pathology Department.* Mycology and entomology, including work on pests of *Albizzia*. *Advisory Branch.* Sprayer and spraying tests, selective weed killers, vegetative propagation.

2069. Churchward, J. G.
Extract from a report on a visit to the territory of Papua and New Guinea to study and advise on tea growing in the territory.
Papua New Guinea agric. Gaz., 1953, **8**: 45-7.
There are considerable areas in which soil and climatic conditions should suit tea, and yearly yields of 600 or more lb. per acre should be obtainable. The most promising sites are on soils derived from trachytic-andesitic material in the Sangara, Mt. Victory and Mt. Hagen areas, the lateral valleys leading into the Baiyer River Valley, areas where the grano-dioritic material from volcanic intrusions has been mixed with schists and gneisses as at Aiyura and Garaina, and high river terraces as in the Goroka and Waghi Valleys.

2070. Shelford, K. O.
An estate investigation into tea in relation to rainfall.
Nyasaland Fmr and Forester, July 1953, reprinted in *Plant. Chron.*, 1953, **48**: 660-5.
An investigation into the relationship between tea yields and rainfall at Chisambo (93 in. annual rainfall) in Nyasaland over a 17-year period led to the conclusion that a high yield depends on good rainfall in the previous cold season and early summer (up to the end of December). Eight tables of yield and rainfall data are given.

2071. Homburg, K.
De practische uitvoering der blister-blight bestrijding. **(Practical aspects of blister blight control.)** [English and Indonesian summaries ¼ and ⅓ p. respectively.]
Bergcultures, 1953, **22**: 467-81, bibl. 6, illus.
The importance of adapting cultural practices in tea plantations to the requirements of chemical control of blister blight is stressed. The most economical and reliable method of control is dusting with copper dusts, provided locally manufactured dusts are used, applied at the rate of 10 kg. 2% copper dust per ha. at short intervals. Increasing the copper concentration of the dust does not proportionally increase the copper cover on the bushes except for the first 2–3 days after application. Reliable protection can also be obtained by spraying with water suspensions, a rate of 10 l. per ha. containing 2·5% copper being recommended. The use of a sticker permits spraying at less frequent intervals. The drift method of application gives the most efficient distribution of both dusts and sprays.

2072. Eden, T.
Blister blight disease of tea.
Pamphl. Tea Res. Inst. E. Afr. **7**, 1953, pp. 5, illus., 9d.
This pamphlet gives information on the symptoms and control of blister blight and is designed to enable prompt recognition and action, should the disease appear in East Africa.

2073. Bokučava, M. A.
The biochemistry of tea. [Russian.]
Priroda, 1953, **42** (11): 90-5, illus.
A review of Russian work discussing the properties of tea leaves, formation of flavour and aroma, colour of infusion and fermentation. The authorities on which the review is based are mentioned, but exact references to particular articles are omitted.

Sundry crops.

2074. Anon.
Kola nuts and kola chocolate. [German.]
Int. Choc. Rev., 1953, **8**: 185-6, from abstr. in *Abstr. curr. sci. tech. Lit.*, 1953, **6**, No. 1143.
The composition of kola nuts is given as follows: Moisture 13·4%; protein 9·56%; fat 1·35%; starch 45·4%; fibre 7·01%; tannins 3·79%; ash 2·90%; theobromine 0·05%; caffeine 2·80%. The caffeine occurs partly in the free state and also in combination with glucose and tannin. It is stated that, in addition to caffeine, the tannin ingredient kola red contributes to the physiological properties of kola nuts. The preparation of kola chocolate, with a caffeine content of 0·20–0·25%, is briefly described.

2075. Ruehle, G. D.
The sapodilla in Florida.
Circ. Fla agric. Exp. Stats **S-34**, 1951, pp. 14, bibl. 13, illus.
Information is included on nomenclature, the varieties Prolific and Russell, frost resistance, soils, propagation by seeds and side grafting, cultural practices, diseases and pests.

2076. Sánchez-Nieva, F., Igaravídez, L., and López-Ramos, B.
The preparation of soursop nectar.
Tech. Pap. P.R. agric. Exp. Stat. Río Piedras **11**, 1953, pp. 19, bibl. 5.
The commercial development of the sour sop (*Annona muricata*) has been handicapped in the past by lack of suitable processing techniques. A method is now described for the canning of a "nectar" prepared from the dispersed pulp. Details are given of the total solids, acidity, sugars and ascorbic acid in both pulp and nectar.

Cover crops.

2077. Foster, Z. C.
Cover crops, green manures, and mulches in management and conservation of the soil.
Agric. ext. Circ. Univ. Hawaii **337**, 1953, pp. 7, bibl. 4.

Information is given on the uses and management of green manure crops, permanent cover crops and mulches in Hawaii. Species of proven or potential value are listed with recommended seed rates.

Noted.

2078.

a ANON.
Durian.
S. Indian Hort., 1953, **1**: 109, illus.
One of a series of short illustrated notes on South Indian fruits.

b ANON.
The effects of organo-mercurial fungicides on sugar cane cuttings.
World Crops, 1953, **5**: 497-8, bibl. 5, reprinted in *Sugar J.*, 1954, **16** (9): 33.
A review.

c BAKER, R. E. D., AND SANDWITH, N. Y.
The gender of *Theobroma*.
Kew Bull., 1953, No. 4, p. 591.
Linnaeus intended it to be feminine.

d BARNES, A. C.
Cane sugar in East Africa.
Proc. 27th annu. Congr. S. Afr. Sugar Tech. 1953, pp. 8-15, illus.
In Kenya, Tanganyika and Uganda. [See *H.A.*, 23: 4657.]

e BHATI, A.
The essential oil from the leaves of guava *Psidium guayava*, Linn. Part I. Allahabad variety.
Perfum. essent. Oil Rec., 1953, **44**: 46-9, 56, bibl. 9.
Physico-chemical properties.

f BHATI, A., BHATTACHARYYA, S. C., AND GUHA, P. C.
The essential oil from the leaves of guava, *Psidium guayava*, Linn. Part II. Bangalore variety.
Perfum. essent. Oil Rec., 1953, **44**: 274-7, bibl. 8.
Physico-chemical properties.

g BICUDO, L. P.
Normas para iniciar uma lavoura de café. **(Rules for establishing a coffee plantation.)**
Fôlha da Manhã, 12 September, 1952, reprinted in *Bol. Super. Sery. Café, S. Paulo*, 1953, **28** (319): 31-5.
Mixed planting of 3 varieties recommended.

h BOLLE-JONES, E. W.
Occurrence of indole-3-acetic acid in laminae of *Hevea brasiliensis*.
Nature, 1954, **173**: 127-8, bibl. 5.

i BUZACOTT, J. H.
A problem in cross-pollination [of sugar cane].
Cane Grs' quart. Bull., 1954, **17**: 109-10, illus.
Delaying or advancing arrowing by altering day-length.

j CAMPOS, J. D.
A freak coconut seedling.
Araneta J. Agric., 1953, **1** (1): 51-2, illus.
The seedling flowered 3½ months after germinating.

k CHAMPION, J.
La culture du bananier en Égypte. **(Banana growing in Egypt.)**
Fruits d'Outre Mer, 1954, **9**: 31-3, illus.

l CHOUDHRI, B. L.
Bilva or bel (*A. marmelos*).
Indian Fmg, 1953, **3** (8): 10-11, illus.
Including yields, composition and uses of fruits of *Aegle marmelos*.

m COPE, F. W.
Some notes on the I.C.S. clones.
J. agric. Soc. Trin. Tob., 1953, **53**: 245-54.
[See *H.A.*, 24: 859.]

n ETHIRAJAN, A. S.
Pollen grains in *Saccharum* and certain allied genera.
Curr. Sci., 1953, **22**: 385-6, bibl. 6.

o FIDEL CASTRO, M.
El mejoramiento del cafeto en Colombia. **(Coffee breeding in Colombia.)**
Bol. inf. Colombia, 1953, **4** (46): 11-30.

p FORD, E.
Crop prospects in the South Pacific.
World Crops, 1954, **6**: 47-50, illus.
Including coconuts, cacao, tea and citrus.

q FRANCO-BÉTANCOURT, J. J.
L'industrie de la banane à Cuba. Produits à base de banane. **(The banana industry and banana products in Cuba.)**
Fruits d'Outre Mer, 1953, **8**: 502-7, bibl. 19, illus.

r GURDIÁN MORALES, M.
Los requisitos minerales de la planta del café. (Una revisión de la literatura.) **(The mineral requirements of coffee. A review of the literature.)**
Suelo Tico, 1953, **7** (29): 86-97, bibl. 22.
N, P, K and Ca.

s HILL-LEWIS, C.
Irrigation for bigger profits.
S. Afr. Sugar J., 1953, **37**: 641-7, 719-27, illus.
Systems recommended for Natal sugar cane.

t HUMPHRY, E. V.
Velvet beans on the Burdekin.
Cane Grs' quart. Bull., 1954, **17**: 79-82, illus.
As a green manure crop for sugar cane.

u HUNGERFORD, T. A. G.
The Australian sugar industry.
World Crops, 1954, **6**: 55-8, 74, illus.
A general survey.

v JARAMILLO-ARANGO, J.
A critical review of the basic facts in the history of cinchona.
J. Linn. Soc. Lond., 1949, **53**: 272-309, bibl. extensive, illus. [received 1954].

w KADEN, O. F.
Searching for suitable cocoa territory in Liberia. [German and English texts.]
Gordian, 1953, **53** (1271): 24-8, (1272): 10-14, (1273): 8-12, illus.
Certain areas in the south-east are promising.

x KRUG, C. A.
Aspectos teóricos y prácticos de un programa de mejoramiento del cafeto. (**Theoretical and practical aspects of a coffee breeding programme.**)
Suelo Tico, 1953, 7 (29): 40-7.
See *H.A.*, 23: 1268.

y KURMANADHA RAO, K. V., AND NARASINGA RAO, M.
Sugarcane wax: occurrence, composition, extraction and refining.
J. sci. industr. Res., India, 1953, **12A**: 453-7, bibl. 37.
A review article. Indian potential production estimated at 45,000 tons p.a.

z MALAN, E. F.
The production of Cavendish bananas.
Fmg S. Afr., 1953, **28**: 365-9, bibl. 12, illus.
In South Africa.

2079.

a MUKHERJEE, S. K.
Origin, distribution and phylogenetic affinity of the species of *Mangifera* L.
J. Linn. Soc. Lond., 1953, **55**: 65-83, bibl. 51, maps.
See also *H.A.*, 23: 4619.

b MYATT, O. W. D.
N.Co. 310 in the Bundaberg district.
Cane Grs' quart. Bull., 1954, **17**: 104-5, illus.
Compared with local varieties.

c PATON, F. J.
The significance of yellow fraction in spontaneous coagulation.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 93-101.
Of hevea latex.

d RAMCKE, C.
Kaffee und seine Kultur in der brasilianischen Baumschule. (**Coffee nurseries in Brazil.**)
Dtsch. Baumsch., 1953, **5**: 325-7.

e RESING, W. L.
Colouring substance of latex.
Arch. Rubbercult., October 1953, *Extra No.* **2,*** pp. 33-8, bibl. 5.

f SCHROO, H.
The use of pot tests in research on the fertility of sugar cane soils. Paper III: A pot experiment on the loss of effectiveness of ammonium sulphate and superphosphate.
Trop. Agriculture, Trin.,† 1954, **31**: 71-8, bibl. 4.
With Sudan grass as indicator plant. For Papers I and II see abstract 2052.

g SESHAGIRI, P. V. V., AND SASTRI, R. L. N.
Investigations into the organic acid metabolism of *Tamarindus indica* Linn.
Proc. Indian Acad. Sci. Sect. B, 1953, **38**: 242-9, bibl. 19.
See also *H.A.*, 23: 1367.

h SIMMONDS, N. W.
Classification of the bananas. III. Critical notes on species. t. *Musa erecta.* u. *Musa angustigemma.*
Kew Bull., 1953, No. 4, pp. 571-4.
See also *H.A.*, 21: 2111c and earlier.

i TOOHEY, C. L.
New fertilizing machines in the Mackay district.
Cane Grs' quart. Bull., 1954, **17**: 87-8, illus.
Two new fertilizer distributors designed for use in growing cane described.

j TRINIDAD AND TOBAGO.
Regulations concerning the importation of plants and plant products, etc.
Bull. Dep. Agric. Trin. Tob. **5**, 1953, pp. 24.

k VALLANCE, L. G.
A comparison of Q.50 and C.P. 29/116 on red volcanic soil at Bundaberg.
Cane Grs' quart. Bull., 1954, **17**: 101-2.
The early season c.c.s. of Q.50 was relatively high.

l VENTURA, T., AND OLALIA, I.
Fiber determination in cane.
Sugar News, 1953, **29**: 569.
Method used by a Philippine company described.

m WISE, C. T.
Cane practices and productivity.
Proc. 27th annu. Congr. S. Afr. Sugar Tech. 1953, pp. 133-4.
Hints based on South African experience.

* Containing papers read at the Conference of Rubber Research Institutes in the Far East, Bogor, 1952.
† Now published in England.

NOTES ON BOOKS AND REPORTS.

Books.

2080. Ames, O., and Correll, D. S.
Orchids of Guatemala.
Chicago Natural History Museum, being *Fieldiana: Botany*, 1952, Vol. **26**, No. 1, pp. 1-395 and Vol. **26**, No. 2, pp. 399-727, 9×6 in., illus., price $5 cloth or $4 paper per number.

Central America has long been known as the home of some of our most attractive cultivated orchids, such as, for example, *Lycaste virginalis* (formerly known as *L. skinneri*), now adopted as the national flower of Guatemala, and *Cattleya skinneri*, which is the national flower of Costa Rica. The region is very rich in members of the Orchidaceae and an up-to-date account of the orchids of one of its constituent States, Guatemala, is therefore most welcome.

The present book was started as a joint venture by Professor Ames and Dr. Correll but, owing to Professor Ames's untimely death, has been written in the main by Dr. Correll. The general format and arrangement of the subject matter is very clear and attractive. Each genus and species is provided with an adequate and well-written description, while there are excellent keys for the identification of the various groups. Like Dr. Correll's book on the North American orchids, the present work is lavishly illustrated with charming line drawings, of which there are nearly two hundred altogether. The majority of these are by Mrs. Ames and Mr. G. W. Dillon, but four other artists are also represented. These drawings depict all the genera dealt with and many species; most of them show the more important diagnostic features of the genera and species concerned. The book is published in two parts which make two handy volumes. There are introductory accounts dealing with the geographical distribution of Guatemalan orchids and the general characteristics of the family. An excellent index of accepted names and synonyms completes the book. Dr. Correll must be congratulated on the production of the first account of the orchids of a region of more than usual interest to students of the family. V.S.S.

2081. Biologische Zentralanstalt für Land- und Forstwirtschaft in Berlin-Dahlem (Bärner, J.).
Bibliographie der Pflanzenschutz- Literatur 1940-1945, I u. II. **(Bibliography of plant protection 1940-1945, I and II.)** [German, English, French introductions and headings.]
Paul Parey, Berlin and Hamburg, 1953, 11×7½ in., pp. 1,308+xlviii, DM. 97 the two parts.

This is the first volume (in 2 parts) of the Bibliography to appear since the war. The next volume covering the period 1946-1951 will follow shortly, and when the series is up to date it is hoped to resume annual publication. The titles are arranged in 4 sections: I. General part (pp. 1–27); II. diseases and their causes (pp. 28–242), including mineral deficiencies, climatic factors, spray injuries, etc.; III. diseases and host plants (pp. 243–1054), including medicinal plants, horticultural and plantation crops and the protection of stored products; IV. methods of plant protection (pp. 1054–1220), including biological control, equipment, legislation, etc. As the author index, printed in 3 columns per page, fills almost 100 pages, it would perhaps be too much to ask for a subject index as well, especially since a very detailed table of contents makes it comparatively easy to find the references to any line of study or to particular pests and diseases. V.H.G.

2082. Blunck, H.
Handbuch der Pflanzenkrankheiten, Band V, Tierische Schädlinge an Nutzpflanzen, 2. Teil, Lieferung 1: Diptera und Hymenoptera. **(Handbook of Plant Diseases. Vol. V, Insect pests of crop plants, Part 2, Sect. 1, Diptera and Hymenoptera.)**
Paul Parey, Berlin and Hamburg, 1953, 10×7 in., pp. 311, bibls. extensive, illus., DM. 80.

The new edition of the first section of Part 2 of Volume V of Sorauer's well-known work concerns the injurious Diptera and Hymenoptera and their host plants. It is edited by Professor H. Blunck, and compiled with the assistance of specialists in their respective groups, namely Dr. H. Hennig and Dr. H. Maercks (Diptera); Dr. H. Francke-Grosmann, Dr. E. Otten and Dr. K. Gösswald (Hymenoptera).

The Diptera are divided into two sub-orders, the *Nematocera* and the *Brachycera*. The former include the gnats, mosquitoes, midges, fungus-eating species, the gall midges and the leatherjackets; the latter, houseflies, fruitflies and the species which infest dwelling houses, etc. This portion occupies one hundred and sixty-six pages. The Hymenoptera are divided into four sub-orders: the *Symphyta* which include the sawflies, wood wasps and aphid species; the *Cynipoidea* or gallflies which produce conspicuous galls on oak, rose and numerous other plants; the *Chalcidoidea*; and finally, the *Aculeata*, which include the ants, bees and wasps.

The pattern of the book follows that of previous editions, very numerous species occurring in all parts of the world being mentioned. A very valuable feature is the comprehensive collection of references which refer to all the species mentioned in the text and have been carefully selected from the literature of many countries. "Sorauer", old or new, is an indispensable up-to-date reference work, and this portion will prove invaluable to workers interested in the Diptera and Hymenoptera. A.M.M.

2083. Bouché-Thomas, E.
La méthode Bouché-Thomas. **(The Bouché-Thomas method of growing fruit trees.)**
Bouché-Thomas, 14 Rue la Fontaine, Angers, France, 1953, 13×10 in., pp. 180, illus.

It is alleged that some 300 years ago La Quintinie, gardener to King Louis XIV, grew the trees at Versailles with severe pruning and as a result produced little fruit, but because he was a prolific writer many others have adopted his methods. On the other hand, Girardot of Montreuil, who made his living out of the heavy crops he produced on his "palmette à la diable", never

described his methods in print and so they are little known. The "palmette à la diable" is, however, the ancestor of the "haie-fruitière" (fruit hedge) of the Angers fruit grower and M. Bouché-Thomas has made a special study of this method of culture. Unfortunately the term "haie-fruitière" has been abused in recent years to describe many different methods, so M. Bouché-Thomas has dropped the term and refers to his method as The Bouché-Thomas. The book describes this method [already briefly described *H.A.*, 18: 2485] as it applies to apples and pears; other volumes will deal with other tree fruits. Essentially the method is a special kind of cordon culture without summer pruning or a supporting fence. Vigorous growth is encouraged by planting deep to obtain scion rooting, and the shoots are not cut back but trained to produce a criss-cross trellis. The retention of the terminal bud is claimed to keep the growth of the other buds on the shoot fruitful. As M. Bouché-Thomas is a practical man, like Girardot, and not a writer, he has relied on many excellent photographs to show his method and the results obtained. The heavy crops depicted are impressive and it is claimed in the text (p. 140) that 60 tons of apples per hectare can be obtained in the seventh year, or 20–30 tons of pears. Doubtless a very favourable climate is needed if crops of this magnitude are to be expected. The book is superbly produced and lavishly illustrated; the brief instructions are direct and simple to follow, and are enlivened by comments and interjections, often in block capitals, that reveal the personality of the author. Its chapters, some very brief, are grouped into six parts covering: the method; the underlying principles; the planting of an orchard; the treatment of the trees year by year; other essential operations; and a summary of the advantages claimed. There are tables of illustrations and of contents, but no index.

H.B.S.M.

2084. Gibberd, A. V., and Gibberd, V. L.
A gardening notebook for the tropics.
Longmans, Green & Co., Lond., 1953, $7\frac{1}{2} \times 5$ in., pp. 184, illus., 6s.

If the authors are perhaps a little too modest in calling their book a notebook they are certainly over-bold in embracing the whole tropics in their title. It is essentially a guide to gardening in Southern Nigeria, and as such it is excellent. It betrays on every page the authors' wide knowledge and experience and is free from the padding and contradictory advice which, alas, mar so many gardening books. It consists of 15 chapters, an eminently practical appendix on gardening tools and their selection, and an index of plants. There is no general index, but the authors no doubt felt that the reader of average intelligence would readily find the object of his search in the proper chapter. The first seven chapters cover general subjects such as climate and soils, manuring and compost, propagation, and cultivation. The next seven are concerned with 6 different branches of gardening, namely vegetables, ornamentals, fruit, lawns, rock gardens and roses, and with the purchase of seeds. The final chapter discusses diseases and pests and their control. It is difficult to single out individual chapters for special mention when all are so informative and lucid, but those on vegetables, roses, and diseases and pests have special merits, the first because of the succinct, but full, instructions it contains on a wide range of species and in particular for the most valuable lists of varieties which should save readers many disappointments, the second for providing in small compass so much straightforward, easily comprehensible information, and the third because it fills what is a yawning gap in the average tropical gardener's knowledge.

The occasional errors in botanical names are an unnecessary blemish. For example, *Cassia sieberiana*, *Colocasia antiquorum*, *Psidium guajava* and *Ipomoea* are misspelt in the text. Some confusion may arise regarding "Neem" (Melia or Azadirachta) which is mentioned on p. 116 in the section on flowering trees in the Ornamental Gardening chapter; presumably the reference is to *Azadirachta indica* (neem, margosa), the fuel plantation tree of Northern Nigeria, whose smallish whitish-green flowers are not particularly ornamental, and not to *Melia azedarach* (Persian lilac), a somewhat similar, much smaller, mauve-flowered tree commonly grown as an ornamental.

Very often a garden in Nigeria is not a lovesome thing, God wot!, but an ill-omened plot in which only weeds flourish. Those who make a garden à la Gibberd should, however, fare well and have "contentment for eternity"—or at least until transferred to another station.

J.D.

2085. Holttum, R. E.
Plant life in Malaya.
Longmans, Green & Co., London, New York, Toronto, 1954, 9×6 in., pp. 254, illus., 18s.

Botanically, Malaya is one of the richest areas of the world. This statement is true whether its basis be floristic or vegetational. There has been an enormous development of genera and species, many endemic, and the lush growth of tall forest can be correlated with the almost optimal environmental conditions, particularly of temperature and humidity, throughout the year. Professor Holttum, from his long personal experiences in Malaya as a professional botanist, is well qualified to describe various aspects of the plant life of the Peninsula. This he has done in what are in the main a series of more or less independent essays dealing either with a particular systematic group of plants or with some life-form or other grouping.

Forest is the characteristic major community of Malaya. The tall evergreen forest covers the whole of the lowlands up to about 4,000 ft., except where it has been destroyed or modified by human interference. In this forest dipterocarps, of many kinds, account for a large proportion of the tallest trees, which control the general organization of the whole community. Smaller trees are very varied. Nearer the ground are shrubs, smoll palms, gingers, ferns, herbaceous plants, and seedlings and young plants of many kinds. Climbers, especially woody climbers or lianes and epiphytes, are exceedingly numerous. Above 4,000 ft. dipterocarps die out and the mountain forest replaces the lowland forest. In this mountain forest members of the oak and laurel families are conspicuous and the ground vegetation is often richer than in the lowland forest.

In the various chapters both structural and physiological accounts are given of many of the more important plants of the Malayan forest. Professor Holttum

has himself specialized on the ferns and their allies and on the orchids. His chapters on these groups have, therefore, a particular value. Several chapters deal with the vegetative life of Malayan plants, such as the structure and behaviour of roots and stems and the many forms of vegetative propagation. Reproduction, with the sequence of flowers, fruits, and seeds under tropical conditions is considered at some length. Yams and other tubers, bananas, and grasses are given separate essays. Studies of life-form groups are included on climbing plants, parasites and saprophytes, and water plants. The close interaction of plants and animals is illustrated not only by the part played by animals in pollination and dispersal but also by the many linkages between plants and ants.

The book is nicely produced. The frontispiece "In the forest in the Bertam valley, Cameron Highlands, Malaya (4,700 feet altitude)" gives a vivid picture of the density and variety of a Malayan mountain forest. In addition, there are many full page line drawings, prepared to illustrate the text. A list of botanical equivalents of Malay and English plant names is useful in reading the book, assuming that the reader is sufficiently acquainted with systematic botany to visualize the plants by their Latin names.

It is stated that the book is primarily intended for residents in Malaya, especially for teachers, senior students in schools, and first year University students. It is, however, not a textbook in the ordinary sense of the term and can be read with interest and advantage by all who wish to learn something of the great wealth of plant life in a tropical country and one that has been "much in the news" in recent years. W.B.T.

2086. I.N.E.A.C.
Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. IV. **(Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes. IV.)**
Institut national pour l'étude agronomique du Congo belge, Brussels, 1953, 10×6½ in., pp. 314, illus.

This volume covers the tribes Sophoreae, Genisteae, Trifolieae and Loteae of the Papilionaceae and contains 18 full-page plates and 20 smaller illustrations.

2087. Köhler, E., and Klinkowski, M.
Handbuch der Pflanzenkrankheiten, Band II, Lieferung 1: Die Viruskrankheiten. **(Handbook of plant diseases, Vol. II, Sect. 1, Virus diseases.)**
Paul Parey, Berlin and Hamburg, 1954, 8½×7½ in., pp. 770, bibls. extensive, plates and figs. 326, DM. 150.

This volume in the Sorauer series is the most comprehensive general textbook on virus diseases of plants seen by the reviewer.

It is divided into two main parts. The first deals briefly with methods of studying viruses, their behaviour in, and their effect on, their hosts. Although condensed into 123 pages, this section would appear to describe recent work most adequately for a book of this type, and is admirably endowed with references to original papers.

The main part of the book, over 600 pages, contains descriptions of all the virus diseases of plants on which work has been published. Some diseases, such as those of coconuts, are included of which viruses are only the suspected cause. The diseases are arranged under host-plant headings, and a useful bibliography is given for each. The many illustrations, reproduced from original papers, are clear and well chosen.

This book is a remarkable compendium of information on virus diseases of plants, and may well become a standard reference work for the advisory plant pathologist and those interested in the general field of virology. An English translation is worth consideration. A.F.P.

2088. Kreutz, W.
Der Windschutz. Windschutzmethodik, Klima und Bodenertrag. **(Windbreaks. Methods of shelter, climate and yields.)**
Ardey Verlag, Dortmund, 1952, 10×7½ in., pp. 167, plus 19 plates, bibl. 110, DM. 11.

This monograph is a stimulating book to browse on or study, not least perhaps because it does not give all the answers but puts its finger on gaps in our knowledge and challenges research workers to supply the missing data. The provision of shelter for crops is a problem the complexity of which will be more readily appreciated after the perusal of this comprehensive account. Although the survey is largely based on the literature, it is enlivened by the author's close connexion with windbreak research at the agrometeorological station at Giessen of which he is the director. The scope of the book may best be gauged from the list of its contents: I. Why is shelter necessary? II. Fundamentals: Definition and measurement of wind; wind effect on soil, plant and forest; local wind research a condition of planning windbreaks. III. Meteorological conditions in the vicinity of windbreaks; air speed; distribution of rain; evaporation; dew formation; air temperature and air moisture; wind and CO_2. IV. Plants (woody and annuals) and artificial screens as windbreaks. V. Effect of shelter on yields, including a section on yield of the windbreaks themselves, in wood, nuts, etc. VI. Technical and legal problems. VII. Windbreaks and pest incidence. VIII. Discussion and summary.

Many more experiments and observations are needed to clarify certain points, but it can already be stated with confidence that windbreaks of the right height and density (not too compact) improve the local and the micro-climate. With irrigation, they will play their part in the conservation of soil moisture, a factor that is gaining in importance as yields increase with improved cultural practices.

On the other hand, the author warns us that the effect of windbreaks is not necessarily wholly beneficial. The danger of spring frost may grow, shade and drought in the immediate neighbourhood of the shelter must be taken into account and the absence of drying winds after rain may favour such diseases as downy mildew of vine. A plea is made for the establishment of three research stations in Germany, where the problem is approached on a regional basis, to study the layout and composition of windbreaks and their effects on a variety of crops, including their influence on quality.

With vegetables, fruit and vines as the main crops to be protected this book can be warmly recommended. V.H.G.

2089. KUMMER, A. P.
Weed seedlings.
Univ. Chicago Press, Chicago 27, distributed by Cambridge Univ. Press, Lond., England, 1952, $8\frac{1}{2} \times 5\frac{1}{2}$ in., pp. xxxiii+435, illus., $5.00 or 37s. 6d.

The weeds considered are those commonly found in gardens, farms, ranches and woods in the U.S.A. and Canada. The scientific nomenclature is that of *Gray's Manual of Botany*, 8th edition, and the common names were arbitrarily selected as suiting readers in the U.S.A. and Canada. The seeds from which the plants were raised were almost entirely collected in the field in the North Central States. Drawings of the seedlings show the general aspect and growth habit of the plant including the roots. Those of a detached seed leaf, as well as of the first, third and fifth leaves, are twice natural size so as to show hairiness and venation. The language used is non-technical.

The author begins with a workmanlike 25-page key to species and varieties, and follows with illustrations and descriptions of 300 species and varieties of weed seedlings. To specialist and amateur alike, this book should be of great value.

D.A.

2090. ORDISH, G.
Wine growing in England.
Hart-Davis, Lond., 1953, $7\frac{1}{2} \times 5$ in., pp. 128, bibl. 60, illus., 7s. 6d.

This small book is the production of one who believes that the best reason for drinking wine is because one likes it. No one, moreover, will disagree with his statement that, unless one makes one's own wine, daily wine drinking in Britain is expensive.

The author lived in France for some years where presumably he became addicted to the habit. Later coming to live in Kent he found the climate not unlike that of Champagne. Very slight further investigation led him to plant vines. "Some good wine and this book are the results." The present reviewer considers them most laudable.

In these few pages the reader will find a clear and concise account of methods first of planting and cultivating his vines and secondly of converting their products into a light, claret-like wine or a white wine resembling still champagne. There is no suggestion of searching Europe or elsewhere for hardy exotics, but while the author notes that claims are put forward on behalf of a number of other vines he finds that Brandt, a hybrid of a Canadian and European grape, followed closely by Gamay Hatif, both with black grapes, will best answer the purpose for red wine, while for white he suggests that Madeleine Royal and Meslier Précoce should be tried. Briefly explaining the main principles underlying wine making, he gives ample practical instructions on how to proceed and discusses the apparatus necessary. While essentially he writes for the householder who wants to "grow" his own wine he devotes one chapter to the consideration of commercial production. This is in the reviewer's opinion the simplest and most satisfactory manual so far produced for the would-be amateur vine grower in England. Note also its price.

D.A.

2091. PRESTON, J. F.
Developing farm woodlands.
McGraw-Hill Book Company, New York, Toronto, London, 1954, $9\frac{1}{2} \times 6\frac{1}{2}$ in., pp. 386, bibl. 130, illus., 36s.

The woodlot is an important aspect of American farming since the majority of farms contain sizeable areas of forest. These scattered patches of natural tree growth which are commonly much larger than the familiar shelterbelt or copse of the British landscape doubtless owe their survival partly to the comparatively short period during which farming has been taking place in the States and partly to the interrelated factors of low population density and greater availability of land. The farm woodlot can be either the aforesaid vestigial patch of natural growth or a plantation created on land more suitable for forestry than arable farming or pasture. Management can be of the commercial type based on the silvicultural requirements of the forest and on forest economics, or it can be intimately linked with the farm economy, the trees being grown as a farm crop.

The author, who has experience of both State and commercial forestry, which can be vastly different propositions, divides the book into 10 chapters. The first is a general consideration of farm forestry. Chapters 2–6 cover cultural operations, namely establishment by natural regeneration, direct sowing or planting, maintenance in early life, thinning and pruning, exploitation. Chapter 7 deals with the marketing of wood (for lumber, pulp, sleepers, poles, fuel and other purposes), and storage, seasoning and preservation. The last 3 chapters deal with the management of the farm woodland for the production of maple sap, of Christmas trees, and of turpentine and rosin. The 10 appendices include a bibliography, a glossary, volume tables, log rules and a modified acreage grid for the rapid and accurate determination of areas on maps of different scales.

The book covers its field in considerable detail and should be of great use to the American farmer and to the many-acred farmer wherever he may be, but its value in Britain is naturally limited by the widely different farming and forestry conditions, species and environmental factors. The small woodland owner should, however, find much of interest in the chapters on cultural practices and on management for Christmas trees.

J.D.

2092. REBOUR, H.
Manuel du planteur. **(Planter's manual [for North Africa].)**
Union des syndicats des producteurs d'agrumes, 12, Boulevard Baudin, Algiers, 3rd edition, 1947, $10 \times 6\frac{1}{2}$ in., pp. 480, bibl. 37, illus.

For temperate and sub-tropical fruit trees in North Africa in general and for Algeria in particular. [Our attention has only recently been drawn to this valuable book.]

2093. SAUNBY, T.
Soilless culture.
W. H. and L. Collingridge, London, and Transatlantic Arts, New York, 1953, $9 \times 5\frac{1}{2}$ in., pp. 104, illus., 12s. 6d.

There have been quite a number of books published

recently on various aspects of soilless culture. Chouard [*H.A.*, 22: 3175] deals mainly with the theory and principles of the system; Ticquet [*H.A.*, 22: 3187] gives practical instructions to growers; Douglas [*H.A.*, 22: 3179] describes a method developed specially for use under Indian conditions; and Hewitt [*H.A.*, 22: 4512] gives a comprehensive review of the use of sand and water cultures for research purposes. This new book is written by a grower in the West of England for growers, and can therefore best be compared with that by Ticquet, though its scope is less comprehensive. The emphasis is on sand culture with overhead watering; gravel culture with sub-irrigation is dealt with somewhat briefly, without details of the testing and adjusting of solutions for use again. The use of vermiculite and cinders as growing media is discussed in 2 short paragraphs and water culture methods are not mentioned. In the later chapters dealing with the production of various crops, only culture in sand (or, in the case of pot plants, sand and peat mixtures) is considered. This concentration on the one most widely used commercial method may limit the value of the book to students.

It is stated in the introduction that "an attempt has been made to simplify soilless culture as far as practicable so that the method of growing can be readily understood and practised by the amateur gardener. The science of nutrient solutions has not been dealt with to any great extent." In the early chapters on nutrient solutions and their management this simplification appears to have gone dangerously far. No warning is given, for instance, concerning the importance of testing the water for its Ca, Mg and Fe contents, and, if necessary, of adjusting the composition of the nutrient solution accordingly. Neither is there any mention of the order in which the chemicals should be added to the solution to prevent precipitation (apart from a recommendation that sulphates and phosphates should be made up in separate stock solutions). Moreover, the statements that iron is a component of the chlorophyll molecule, and that the nutrient solutions given "do not contain a high proportion of base or positive elements" tend to shake the reader's faith slightly.

When the author comes to deal with the soilless culture of specific crops, confidence returns, and his personal observations and practical experience will be of real value to growers. The crops considered are tomatoes, perpetual flowering carnations and pot plants, including freesias, cyclamen, hydrangeas, chrysanthemums, begonias, roses and gerberas. The culture of lettuce is not dealt with. This is a little surprising, not only because lettuce is a popular subject for soilless culture but because a thriving crop of lettuce is pictured on the dust cover. Finally there are chapters on dry feeding and on nutrient solutions for plants in soil.

The line drawings illustrating the construction of beds are simple and clean, and the photographs showing the methods used and the impressive results obtained are of excellent quality. P.R.-D.

2094. Steinmetz, E. F.
Vocabularium botanicum. **(Plant terminology** [in 6 languages].)
E. F. Steinmetz, Keisersgracht 714, Amsterdam, 2nd edition, 1953, $8\frac{1}{2} \times 8\frac{1}{2}$ in., pp. 362, 56s. 3d. or $7.85.

The author in his preface states that the work is intended for the use of those who are not sufficiently familiar with the meaning of the scientific terms used in trade literature and in catalogues. The key languages are Latin and Greek and equivalents are given in Dutch, German, English and French. As regards the English it is English at its simplest and most easily understood, which is all to the good.

The entries are tabulated opposite one another in the different languages and this enhances the book's utility. The paper is not very good, the printing is not very black, but the lay-out is clear and distinct and one reader at least feels that he would not willingly part with his copy. D.A.

2095. Zippelius, H.
Die Bodenlockerung im Obst-, Land- und Weinbau durch das Sprengverfahren. **(The use of explosives for subsoil working in fruit growing, agriculture and viticulture.)**
Grundlagen u. Fortschritte im Garten- u. Weinbau, Eugen Ulmer, Stuttgart (at present Ludwigsburg), 3rd revised edition, 1953, Heft 63, $8\frac{1}{2} \times 6$ in., pp. 59, DM. 2.20.

Anybody suspecting that the roots of his fruit trees have not all the "Lebensraum" they need will profit from studying this little book. The use of explosives may be the answer to his troubles, whether an established orchard fails to thrive or a new orchard is to be planted over a hard pan. Data on yields and growth of comparative trees and calculations of labour requirements show both what spectacular improvement can be brought about by this technique and how very many working hours can be saved. The same advantages are claimed for vineyards and, in some cases, for vegetables. Even where no hard pan exists the making of plant holes for trees by explosives is held to be much more economical than hand-digging. The author states with the assurance of 30 years' experience that if the operation is carried out expertly the soil will retain the structure it acquires after the explosion and will not revert to its former condition. Earthworms and other agents will see to that. Precise and detailed instructions, supported by many illustrations, are given on the use of explosives in the orchard, e.g. on preparing the cartridge, on determining the charge and the depth at which it is to be placed by trial shots, on safety precautions, etc. Complementary cultural measures, such as the application of fertilizers to the subsoil after loosening, are also fully discussed. Growers following the instructions closely—and holding the necessary licence—should have a good chance of survival. If in doubt they are generously invited by the author to turn to him for further advice. V.H.G.

Annuals and reports.

2096. Algérie, Gouvernement Général.
Rapport du Conseil de l'Expérimentation et des Recherches Agronomiques pour 1952. **(Report of the Council for Experimentation and for Agronomic Research for 1952),**
Algiers, 1953, pp. 256.

Organic manuring. Cultivation *v.* non-cultivation in fruit growing; green manuring of vine and date palm; vine shoot compost. *Mineral fertilization.* Citrus

(effect of high N on flower drop, N leaf sprays, soil injections, minor elements) and date palm. *Irrigation.* Citrus (sprinkler, furrow, plough pan) and date palm. *Vegetables. Tobacco. Vines:* variety collection, rootstock resistance to available lime, grafting experiments, clonal selection. *Fruit tree crops.* Physiology: flowering and fruiting studies on date palm and fig. Clonal selection of citrus and pecan. Cultural techniques for olive and date palm. Processing of figs and dates. *Flower crops.* Roses and bulbs. *Market garden crops.* Tomatoes and strawberries. *Growth substances:* various studies involving vine, bougainvillea, citrus, fig, olive, date; and herbicides. *Plant parasitology.* Pests and diseases of lentils, vines, citrus and dates.

2097. CONNECTICUT (STORRS).
Report of the Storrs Agricultural Experiment Station for the year ending June 30, 1952, being *Bull.* **296,** 1953, pp. 23.
The report consists mainly of a list of the Station's research projects, which include investigations on flowers, vegetables, tree and small fruits and tobacco.

2098. CYPRUS (JONES, D. K.).
Annual Report for 1952. Annexure IV. Annual Report of the Agricultural Research Officer for 1952, 1953, pp. 33.
Crop investigations: Trial of newly introduced avocado and strawberry varieties; vine—American rootstock and intercropping experiments. *Seed production:* vegetable seed for export and local use, flower seed for local use. *Plant protection: Ceratitis capitata* control experiments.

2099. D.S.I.R., N.Z.
27th Annual Report of the Department of Scientific and Industrial Research, New Zealand, for 1952-53, Wellington, 1953, pp. 107, 4s.
Fruit Research Station: Wide use of hormones on glasshouse tomatoes increased *Botrytis cinerea* infection and caused fruit hollowing; several tangelo varieties showed some promise; apple and pear rootstock trials continued; frost protective devices were tested. *Hop Research:* Breeding; verticillium wilt reported for the first time in N.Z.; chemicals for the control of black root-rot. *Plant Diseases Division:* Study of pests and diseases attacking horticultural crops; infection with certain viruses was prevented or delayed by dilute solutions of a substituted purine applied to the plants; insecticide and pesticide studies. *Tobacco Research:* Weed control, varieties, breeding and curing; disease investigations; effect of fertilizers on leaf. *Cawthron Institute:* In tobacco, hop and entomological investigations the Institute collaborates with D.S.I.R. and reports jointly in the appropriate sections. Notes are given on nutrition, fruit research and tomato investigations. *Commonwealth Agricultural Bureaux:* The functions of the organization are outlined.

2100. F.A.O.
Fats and oils No. 5.
FAO Commodity Rep., 1953, pp. 61.
World production of fats and oils in 1952 (excluding the U.S.S.R.) exceeded pre-war production by about 16%. A slight deficit still exists in production *per caput* but this has been largely met by a marked increase in substitutes for fat and oil products. International trade in fats, oils and oil seeds was considerably smaller than in the 1950 and 1951 peak period. Prices declined materially early in 1952 but since then they have fluctuated, prices of certain products, notably copra and coconut oil, advancing considerably while others have remained steady or continued to decline. Among the products for which details of production, trade, and prices are given are those derived from coconuts, oil palms, olives, tung and castor beans.

2101. FLORIDA.
Annual Report of Florida Agricultural Experiment Stations for the year ending June 30, 1952, pp. 310, illus.
Progress is reported on several hundred research projects undertaken by 12 departments of the main station, 5 field laboratories and 10 branch stations. The principal crops include citrus, avocadoes, mangoes, tung, pecans, strawberries, grapes, sugar cane, tobacco, tomatoes, watermelons, celery, cabbage, lettuce, camellias and gladioli. For most of these, aspects under investigation include cultural measures, nutrition and the control of pests and diseases, and for some processing, marketing and by-products. [Separate abstracts of several items will be found in the appropriate sections of this number.]

2102. FORT WILLIAM (KNIGHTS, J. K.).
Progress Report District Experiment Substation, Fort William, Ontario, 1948-1952, 1953, pp. 47.
In addition to Fort William the report includes an account of work at the associated Illustration Stations at Dryden, Kenora, Emo and Fort Frances. *Horticulture:* Varieties of small fruits and vegetables and certain hardy varieties of apple, crabapple and plum are recommended for planting in sheltered locations.

2103. GOLD COAST.
Report of the Department of Agriculture, Gold Coast, for the year 1951/52, 1953, Accra, pp. 25, 2s. 6d.
Cacao: research on possibilities of the systemic insecticide hanane as an aid to the control of swollen shoot disease. *Other crops:* citrus, coconut, pineapple, sugar cane, tobacco, vegetables. *Entomology:* control of citrus ants (*Oecophylla smaragdina*) with a DDT/nicotine sulphate spray.

2104. GULVAL EXPERIMENTAL STATION (ABBISS, H. W.).
Growers' notes and station record 1950-51. N.A.A.S., South-western Province, Bristol, 1953, pp. 60, illus.
This report, the final one before the closing down of the station, covers the period April 1950 to December 1951. Vegetables: broccoli, spring cabbage and lettuce yield and variety trials, the responses of marrows and cucumbers to cloches and soil warming. Bulbs: daffodil and tulip angle of planting, narcissus manuring, gladiolus variety trial, weed control, storage temperatures, relative flowering dates. Other flower crops: variety and other trials, cut flowers. Notes on diseases and pests include one by L. N. Staniland on the use of

chlorphenol in hot-water baths for the treatment of eelworm in infested bulbs [see separate abstract].

2105. Horticultural Education Association.
H.E.A. Annual Report 1953, Part 1. Reports and papers of the York and Cambridge Conferences, [*Spring and Summer 1953*], pp. 124, obtainable from Editor, "Tilings", Shamley Green, Guildford.

Subjects discussed at the Conferences, of which accounts are given here, include the following: Establishment and maintenance of sports turf; Dutch lights (*a*) as used in the East Riding of Yorkshire, (*b*) construction, (*c*) cropping systems and (*d*) crops; forcing rhubarb; fen drainage; horticulture in the Eastern Province of England; diseases of horticultural crops in East Anglia; *Didymella* stem rot of tomatoes; eelworms and crop rotation; horticulture and rural studies in schools.

2106. Illinois.
Research Progress at the Illinois Agricultural Experiment Station, being *Report for 1950/1952,* Urbana, 1953, pp. 134.

Horticulture: Virus studies; antibiotics; fungicides to control fruit and vegetable diseases; nematodes; new vegetable varieties; pigment formation in tomatoes; strawberry variety trials; thinning and prevention of pre-harvest fruit drop in apples; flower studies.

2107. Luddington (N.A.A.S.).
Report of the Luddington Experimental Horticulture Station for 1952, Stratford-on-Avon, 1953, pp. 82, illus.

Includes an account of work in the fruit, vegetable, intensive cultivation, flower and glasshouse departments. [See also separate abstracts.]

2108. Madras Department of Agriculture.
Reports on the work of the Agricultural Stations in the Madras State for 1950-51, 1953, pp. 788.

Anakapalle and Gudiyattam sugar cane stations: Variety and cultural trials, N nutrition, leaf analysis, manurial and topping trials, water requirements, growth studies, mycology and entomology. *Coonoor Pomological Station:* Apple, plum, pear, peach, persimmon, vegetables, medicinal and other economic plants. *Burliar Fruit Station:* Mangosteen, jack, durian, breadfruit, clove, nutmeg, litchi, pummelo. *Kallar Fruit Station:* Mangosteen, citrus and others. *Kodur Fruit Station:* Citrus and mango. *Aduthurai Banana Station. Tindivanam Research Station:* castor. *Nileshwar Research Station:* coconut.

2109. Queensland.
Annual Report of the Department of Agriculture and Stock for the year 1952/53, 1953, pp. 118, illus.

Agriculture Branch: Vegetables, tobacco (variety and rotation trials). *Horticultural Branch:* Pineapples, bananas, citrus, deciduous fruits, papaws, strawberries, mangoes, macadamia, avocadoes, passion fruit, figs, vegetables, quick freezing, tropical crops (coffee, pepper), sterilization of produce against fruit fly. *Science Branch:* Pathology, botany, entomology.

2110. Rumbeke-Beitem (Westvlaamse Proeftuin).
Verslag Westvlaamse Proeftuin, Rumbeke-Beitem, 1952. (**Report of the West Flanders Experimental Garden, Rumbeke-Beitem, for 1952**), pp. 28, illus.

Brief notes and/or tables are given concerning the following experiments. Spraying trials for aphids and apple scab. Manurial trials with apples and pears. Effect of a windbreak and straw mulch on yields of pears. Blossom and fruit thinning of apples. Effect of growth substances on colouring of apples. Effect of rootstock on yield and vigour of apple varieties. Productiveness of apple, pear and plum rootstocks in the nursery.

2111. Tysser, H. F. (Editor).
The Fruit Annual 1953/54.
British-Continental Trade Press, Strand, London, 1954, pp. 532, £1.

The enterprising mixture much as before and none the worse for that. Among subjects of current interest on which articles by experts are provided are the following: Storage of apples, storage of citrus, quick freezing. The rest of the book provides encyclopaedic information essential to the office desk of the fruit or nut merchant.

2112. Vanderwalle, R.
Observations et recherches effectuées à la Station de Phytopathologie de l'État pendant l'année 1952. (**Observations made and research conducted at the Belgian National Phytopathology Station during 1952.**)
Bull. Inst. agron. Gembloux, 1953, **21**: 160-71.

Observations were made on weather in relation to the incidence of diseases in tobacco, root and market garden crops, ornamentals, top fruits, small fruits and vines. Research was conducted on fungal diseases (witloof chicories resistant to *Verticillium dahliae*), physiological diseases (mineral deficiencies, especially in the vine; vine leaf reddening), and virus diseases (turnip mosaic and yellows, cherry viruses, and strawberry virus transmission by aphids).

2113. Wisconsin.
What's new in farm science, being *69th A.R. Part II. Wisconsin Agricultural Experiment Station for 1951/52,* Madison, 1953, pp. 65, illus., issued as *Bull.* **509.**

Fruits and vegetables: pests and diseases of cherry and their control; orchard fertilization; test sprays for apple scab; pea aphid control; liming of pea fields; onion maggot and onion smut control; a new disease of in-bred cabbage; scab-resistant cucumber.

New or revived periodicals

2114. Araneta Institute of Agriculture.
Araneta Journal of Agriculture [*Araneta J. Agric.*], 1953, Vol. 1, No. 1, pp. 55, illus., Araneta Inst. Agric., Victoria Park, Malabon, Rizal, Philippines, $2.00 (U.S.).

The first number of this new quarterly journal contains original papers on annual and perennial economic crops and animal husbandry.

2115. Department of Agriculture, Fisheries and Forestry, Hong Kong.
Food and Flowers, Bull. Dep. Agric. Hong Kong [*Food and Flowers*] **3,** 1953, pp. 62, illus., $5.

Publication of the bulletin was suspended in 1948 and has now been resumed.

2116. Department of Agriculture, Stock and Fisheries, Port Moresby.
The Papua and New Guinea Agricultural Gazette [*Papua New Guinea agric. Gaz.*], 1953, Vol. **8,** No. 1, pp. 58, illus., 1s. 6d. per number or 6s. per annum.

The old *New Guinea Agricultural Gazette* is revived under a new name after an interval of more than 10 years. It will be published quarterly and will deal with recent advances in tropical agriculture. Horticultural subjects covered in the first issue are vegetative propagation of cacao from greenwood cuttings, coconut diseases, tea growing in the territory, and coconut plantation hygiene and the rhinoceros beetle.

2117. Deutsche Akademie der Landwirtschaftswissenschaften.
Archiv für Gartenbau (*Archives of Horticulture*) [*Arch. Gartenb.*], 1953, Vol. **1,** No. 1/2, pp. 142, illus., Deutscher Bauernverlag, Berlin C2, Am Zeughaus 1-2, DM. 5 per single number, DM. 10 per double number.

The first double number of the new journal, published under the auspices of the German Academy of Agricultural Sciences in [East] Berlin, contains only papers by workers in Eastern Germany; but it is the declared policy of the editors to accept also contributions by horticultural scientists from Western Germany or indeed from any other country. A reference in the introduction to *Gartenbauwissenschaft* suggests that it is hoped to make the *Archiv für Gartenbau* a successor* to that excellent periodical. There will be six numbers per year.

2118. Universidad Central del Ecuador.
Boletín del Instituto de Ciencias Naturales (*Bulletin of the Institute of Natural Sciences*) [*Bol. Inst. Cien. nat.*], Quito, 1952, Vol. **1,** No. 1, pp. 216.

This new journal replaces the former *Boletín del Instituto Botánico de la Universidad Central.* The Botanical and Anthropological Institutes and the Geological and Zoological laboratories and museums are now merged in the Instituto de Ciencias Naturales which was founded in 1951. Botany, agriculture, fruit growing, horticulture, phytopathology, entomology and agricultural chemistry are among the subjects covered.

Noted.

2119.

a Australian Canned Fruits Board.
Twenty-seventh Annual Report of the Australian Canned Fruits Board for year 1952/53, 1953, Melbourne, pp. 41.
Apricots, pears, peaches, pineapples and mixed fruits.

b Cameroons Development Corporation.
Annual Report of the Cameroons Development Corporation for the year 1952, 1953, pp. 33, illus.
Bananas, rubber, oil palms.

c Dominion Council of Commercial Gardeners Ltd., N.Z.
Official Report of the 25th Annual Meeting and Conference 1953, pp. 46.

d Hong Kong.
Annual Report by the Director of Agriculture, Fisheries and Forestry, Hong Kong, for 1952/53, 1953, pp. 88, $5.

e Horticultural Education Association.
H.E.A. Annual Report 1952, 1953, pp. 152, obtainable from Editor, H.E.A., "Tilings", Shamley Green, near Guildford, Surrey, England.

f Kenya.
Annual Report of the Kenya Department of Agriculture for 1952, Vol. I, 1953, pp. 59, 3s.

g "De Lange Ossekampen", Wageningen.
Jaarverslag 1951, Centrale Bemestingsproefveld voor de Fruitteelt "De Lange Ossekampen", Wageningen. **(Annual Report "De Lange Ossekampen" Central Manurial Trial Ground for Fruit Culture, Wageningen, for 1951),** pp. 86, illus.
Manurial trials with apples, pears and red currants.

h Santa Barbara Botanic Garden, California.
A.R. Santa Barbara Botanic Garden for 1952, 1953, pp. 29, illus.

i Sarawak.
Annual Report of the Sarawak Department of Agriculture for 1952, 1953, Government Printer, Kuching, pp. 20.

j Sudan.
Annual Report of the Research Division, Ministry of Agriculture, Sudan, 1949/50 1952, pp. 141.
Includes safflower, castor, and the control of canal weeds.

k Wageningen, Plantenziektenkundige Dienst.
Jaarboek 1951/1952. **(Yearbook of the Plant Pathology Service, Wageningen, 1951/1952.)**
Meded. PlZiekt. Dienst **120,** 1953, pp. 261, illus., fl. 7.75.
Articles have been abstracted separately.

l Waite Agricultural Research Institute.
Report of the Waite Agricultural Research Institute, S. Australia, and Associated Activities of the C.S.I.R.O. 1950/1951, 1953, pp. 62.

m Wattle Research Institute.
Report of the Wattle Research Institute for 1952/53, Pietermaritzburg, South Africa, 1953, pp. 55.

* Since going to press we are informed that the original *Gartenbauwissenschaft* is to be revived in Western Germany.